

Previous working papers of the Maricopa Association of Governments' Regional Aviation System Plan Update (MAG RASP) have described the existing facilities at the Region's airports, projected aviation demand through 2025, analyzed the capacity of the system, and identified alternatives to address deficiencies. Working Paper Number 5 presents an evaluation of the four alternatives using nine specific criteria. A summary of the alternatives is provided first, followed by the evaluation of the alternatives by criterion.

It is important to understand the context in which the alternatives were evaluated. From a system planning perspective, alternatives are evaluated to provide information on how the system can be improved by identifying the major projects needed for the Region. The analysis of alternatives in this study is a strategic systems analysis. The purpose of the analysis is to show what the Region's aviation needs are, how those needs could possibly be met, and to recommend where additional study or implementation on an airport-specific level could occur to enhance the overall Region's aviation system. It is intended that while the alternatives are being evaluated as whole alternatives, analysis of the impact on each airport is conducted as well. This airport-specific evaluation provides a means for future development of a recommended plan which may consist of a hybrid of the four alternatives.

## **SUMMARY OF ALTERNATIVES**

The four alternatives that were identified included:

- ☐ Status Quo
- ☐ Improved Technology
- ☐ Maximized Development of Existing System
- ☐ New Airport Development (general aviation and/or commercial service)

The Status Quo is used as the baseline against which other alternatives are compared in terms of the impact to the various criteria from development proposed as part of the four alternatives. Specific projects associated with each alternative are summarized in **Table 5.1**.

**Table 5.1**  
**Summary of Major Items for 4 Alternatives**

Alternative	Major Items
Status Quo	<i>Currently programmed projects:</i> Runway extensions – Buckeye, Glendale*, Wickenburg
Improved Technology	<i>Improved approaches to afford additional operating capacity:</i> Most expected improvement – Phoenix Sky Harbor, Williams Gateway, Scottsdale
Maximized Airport Development	<i>Expand airports with capacity constraints and upgrades:</i> Buckeye – longer runway, precision approach Chandler – longer runway, precision approach Glendale – taxiway extension, precision approach Memorial – restoration, new taxiway, nonprecision approach Mesa – precision approach Phoenix-Deer Valley – parallel runway, precision approach Phoenix-Goodyear – parallel runway, precision approach Phoenix-Sky Harbor – 4th runway, precision approach, additional terminal Pleasant Valley – pave runway & parallel taxiway, nonprecision approach Scottsdale – precision approach Wickenburg – nonprecision approach Williams Gateway – additional runway, longer existing runway, precision approach, additional terminal space
New Airport Development	<i>GA:</i> Peoria/Pleasant Valley Wickenburg/Forepaugh New – south/southeast search area (south of Chandler) New – northeast search area (northeast of Scottsdale)  <i>Commercial:</i> Expand Williams Gateway New – north search area (studied by City of Phoenix) New – south search area (studied by ADOT – RAFA)

Source: Wilbur Smith Associates

\* The runway extension programmed for Glendale was completed in 2003.

It should be noted that under the new airport development alternative, each general aviation and commercial airport is evaluated separately. The impacts associated with each proposed new airport are evaluated as sub-alternatives to determine the specific impacts related to each. A general search area has been identified for new airports, but a specific site has been assumed from which to perform the evaluation. **Exhibit 5.1** identifies the locations of the potential new airport sites.

While there are four alternatives that have been identified for analysis in this study, some of these alternatives can be viewed as more additive than completely separate alternatives. For example, all projects included in the Status Quo alternative are also part of the three remaining alternatives. It is also anticipated that the Improved Technology alternative would be implemented as part of the Maximized Airport Development and New Airport Development alternatives, with the purpose of the Improved Technology alternative being to evaluate whether these enhancements could alone resolve the Region's identified capacity shortfall. The Maximized Airport Development and New Airport Development alternatives are more stand-alone options. While these alternatives are being evaluated as whole

alternatives, the projects and new airports considered with each alternative are analyzed separately for certain criteria for future reference.

## **SUMMARY OF EVALUATION BY CRITERION**

Nine criteria were selected for evaluation to enable the comparison of the four alternatives. These nine criteria include:

- ☐ Environmental (noise and air quality)
- ☐ Costs/Economic Benefits
- ☐ Delay
- ☐ User convenience
- ☐ Access improvements
- ☐ Airspace compatibility (Luke AFB and Region)
- ☐ Ease of implementation
- ☐ Title VI
- ☐ FAA/ADOT design compliance

A discussion of each criterion and the process used to evaluate the alternatives is provided below.

### **Environmental**

There are two environmental issues included in the evaluation of the alternatives in the RASP: noise and air quality.

#### ***Noise***

To evaluate the alternatives in terms of noise, noise contours obtained through existing sources (master plans, Part 150 Studies, environmental assessments, 1996 MAG Implementation Study) were used. Typically, the FAA measures airport noise in terms of an annual day-night average sound level (DNL), which represents the general level of noise exposure that results from the operation of an airport. The focus of the RASP analysis was on 65 DNL noise contours since this is the standard used by the FAA in its analysis of noise. All future references to noise contours in the RASP relate to the 65 DNL.

It is important to note that new noise contours were not developed as part of the RASP. The analysis of noise for the RASP uses 2025 as the base year for evaluating the impact of noise for the four alternatives. In reviewing the data used to calculate the future noise contours provided by the airports, it was determined that while the forecast years may not be consistent between the future years used by the airports for their noise contour development compared to the RASP's forecast out-year (2025), it was more important to compare the operations levels used in the studies and in the RASP to determine the compatibility of the noise contours. A summary of dates for the contours and associated activity levels is provided in **Table 5.2**.

**Table 5.2**  
**Future Noise Contour and Operational Data**

Airport Name	Future Noise Contour			RASP
	Source	Year	Ops	2025 Ops
Buckeye Municipal	1993 EA	2013	148,400	215,200
Chandler Municipal	Part 150	2020	294,300	514,500
Estrella Sailport	1993 RASP	2015	53,600	16,500
Gila Bend Municipal	1993 RASP	2010	57,300	57,800
Glendale Municipal	1998 EA	2015	215,000	197,000
Memorial	Master Plan	2015	39,000	5,500
Mesa Falcon Field	Master Plan	2015	349,600	472,100
Phoenix - Deer Valley	Master Plan	-	520,000	640,600
Phoenix - Goodyear	Master Plan	1999	320,000	334,200
Phoenix - Sky Harbor International	Part 150	2015	773,070	724,400
Pleasant Valley	1986 RASP	2005	107,000	134,300
Scottsdale	Part 150	2015	250,700	262,600
Sky Ranch Carefree	1986 RASP	2005	26,000	13,000
Stellar Airpark	1986 RASP	2015	200,000	78,400
Wickenburg Municipal	1999 EA	2020	38,690	38,100
Williams Gateway	Part 150	2020	338,200	420,300

Source: Wilbur Smith Associates, Airport Studies (as noted in table)

As shown in Table 5.2, for the future noise contours, the majority of the RASP projections are similar or higher than the operational levels used to generate the airport-specific noise contours. For these airports, the future airport-specific 65 DNL noise contours are used to evaluate the noise impact for the RASP.

There are five airports in which RASP projections were higher than the airport-specific planning studies' projections used to generate future noise contours. The most significant projection (more than 50,000 annual operations) in operations for the airports comparing their noise contour operations levels from airport-specific planning studies and the 2025 RASP operations levels are the following:

- ❑ Buckeye Municipal (66,800 annual operations more in RASP)
- ❑ Chandler Municipal (220,200 annual operations more in RASP)
- ❑ Mesa Falcon Field (122,500 annual operations more in RASP)
- ❑ Phoenix – Deer Valley (120,600 annual operations more in RASP)
- ❑ Williams Gateway (82,100 annual operations more in RASP)

Of these airports, Buckeye Municipal, Chandler Municipal and Mesa Falcon Field have similar aircraft types operating at the facilities, while Phoenix – Deer Valley and Williams Gateway have more jet aircraft activity projected to operate at the airports. For this analysis, potential noise impact areas were developed beyond the existing contours for these five airports to evaluate the potential noise impact of the alternatives.

The noise impact areas were developed for these five airports through examination of the difference in the annual operation estimates used to generate the airport-specific contours and the RASP operation estimates. The operational fleet mix anticipated for these five airports was also considered, as well as the ratio of the length of the existing contours to the operational levels used in the development of the contours. In general terms, there is not a direct, one-for-one correlation for an increase in airport operations to the size of the noise contours. As previously noted, airport noise is typically measured in terms of an annual day-night average sound level (DNL) that represents the general level of noise exposure that results from the operation of the airport. The noise impact areas were developed to increase

the size of the impact area to reflect the higher level of annual operational activity projected as part of the RASP. In addition, for the three airports with programmed projects, noise impact areas were also developed to address the projects' anticipated noise impact for the Status Quo alternative.

It is important to note that the noise impact areas have been developed as generic outlines of areas that have the potential to be impacted by noise, with the noise contours used as a basis for their development. The use of "boxes" to represent the noise impact areas is similar to the design used by the State of Arizona in its statutes that address airport noise. Arizona has several statutes in place that were developed to reflect the importance of addressing airport noise. The first, Airport Influence Area (ARS: 28-8485), was implemented in 1997. At this same time, to encourage the preservation of military airports in Arizona, Military Airport Registry was also implemented (ARS: 28-8483 and 28-8484), which was later amended to Military Airport Disclosure. The Public Airport Disclosure (ARS: 28-8486) was implemented in 2000.

The Airport Influence Area statute allows the development of an airport influence area to serve as a notification that properties are located in the vicinity of an airport that may be impacted by noise levels or aircraft overflights. If an airport influence area is established, a record must be filed in each county that contains property in the area such that notification of homeowners within the area. The airport influence area is not restricted in size to noise contours, but can be established to address issues such as overflights from training or significant activity levels that occur as a result of aircraft operating patterns. None of the MAG airports have implemented an airport influence area.

The Public Airport Disclosure statute requires that the public airports work with the Arizona Department of Real Estate to develop a map "showing the exterior boundaries of each territory in the vicinity of a public airport." Within the territory is defined as property that is within the traffic pattern airspace, including property that is within a certain DNL, determined based on county population. For counties with a population of less than 500,000, 65 DNL is the standard; for counties with more than 500,000 in population such as Maricopa County, 60 DNL is the standard. The map is then recorded with the applicable county recorder(s) and made available to the public – there is no requirement for distribution. The following airports in the MAG Region have disclosure maps on file with the Arizona Department of Real Estate:

- ☐ Chandler Municipal
- ☐ Glendale Municipal
- ☐ Mesa Falcon Field
- ☐ Phoenix-Deer Valley
- ☐ Phoenix-Goodyear
- ☐ Phoenix-Sky Harbor International
- ☐ Scottsdale
- ☐ Wickenburg Municipal
- ☐ Williams Gateway

The Military Airport Disclosure works similarly, with maps prepared for Arizona's major military installations including Luke Air Force Base, as well as Davis-Monthan Air Force Base and Yuma Marine Corps Air Station. Luke's "territory" is defined in the statute as being within Maricopa County, 10 miles to the north, south and west, and 4 miles to the east parallel from the center of the main runway.

**Appendix A** presents the current maps on file with the Arizona Department of Real Estate. These maps were considered in the development of the noise impact areas for the RASP's alternatives analysis.

### Status Quo Alternative

**Exhibit 5.2** depicts the potential noise impacts on future land uses that may be associated with the Status Quo alternative. As shown in Exhibit 5.2, the noise contours and impact boxes were overlaid on MAG's 2020 Future Land Use Plan to determine the impacts. Primary impacts are defined as those impacts within the noise contours and impact boxes. Secondary impacts are outside of the noise contours and impact boxes but adjacent to the contours in boxes indicating a more limited noise impact. The following descriptions summarize the types of land uses that may be impacted as a result of implementing the Status Quo alternative, by airport.

#### ❑ **Buckeye Municipal**

The noise impact area for Buckeye under the Status Quo alternative shows an impact primarily to areas planned for mixed land uses, with a limited single-family residential impact. Noise impacts may occur to the north in areas along Yuma Road and near Interstate 10. Secondary impacts include areas to the east that are planned for single-family and commercial development, along with additional single-family residential uses to the west. There is a large dairy farming operation located approximately one mile to the south. Less than 10 percent of primary noise impacts affect uses considered non-compatible with airport-related noise. Areas surrounding Buckeye are expected to experience high growth levels in the future. There are limited zoning restrictions in place and area developers are purchasing undeveloped parcels of land, anticipating continued demand for residential and commercial projects in relation to the airport.

#### ❑ **Chandler Municipal**

The noise impact area for Chandler under the Status Quo alternative shows an impact primarily to undeveloped areas, with a significant impact on areas planned for mixed land uses. No incompatible uses have been identified by the airport within its 65 DNL contour. Noise impacts may occur to the west in areas along McQueen Road or to the north near Cooper Road. Secondary impacts include areas to the north, south and east that are planned for mixed land uses, along with areas to the north and west that are planned for employment centers, commercial development, and additional single-family residential uses. Less than 10 percent of primary noise impacts affect uses not considered compatible with airport-related noise. Chandler Municipal Airport has developed a pilot guide to assist in identifying noise sensitive areas around the airport, and to recommend particular traffic pattern altitudes for different aircraft types. The airport also provides monthly operations information to property owners along with a noise information packet based upon the airport's FAR Part 150 Noise Compatibility Study. The airport website also provides procedures and contact information for registering complaints about noise related to the airport.

#### ❑ **Estrella Sailport**

The noise contour for Estrella under the Status Quo alternative appears to impact primarily areas planned for single-family residential land uses and undeveloped areas in Pinal County. Noise impacts may occur to the south in areas along Maricopa Road. Roughly 70 percent of primary noise impacts affect uses not considered compatible with airport-related noise. It is important to note that Estrella's most significant use is for sailplanes which do not have engines to create noise impacts.

#### ❑ **Gila Bend Municipal**

The noise contour for Gila Bend under the Status Quo alternative shows an impact primarily to areas planned for employment centers. Noise impacts may occur to the north in areas along SR 85 or to the south along Maricopa Road. Secondary impacts include areas to the north, south and east that are planned for single-family residential land uses, along with areas to the west that are planned for multi-family residential uses, mixed land uses, and commercial development. No incompatible uses were identified within the primary area.

#### ❑ **Glendale Municipal**

The noise contour for Glendale under the Status Quo alternative shows an impact primarily in areas planned for mixed land uses and undeveloped areas. No incompatible uses have been identified by the airport within its 65 DNL contour. Noise impacts may occur to the north along Glen Harbor

Boulevard and 99<sup>th</sup> Avenue, or to the south along Camelback Road and 107<sup>th</sup> Avenue. Secondary impacts include areas to the north and east that are planned for mixed land uses, along with areas to the north, south and west that are planned for single-family residential uses. Secondary impacts also may affect areas planned for commercial development, multi-family residential and other employment centers. Less than 10 percent of primary noise impacts affect uses not considered compatible with airport-related noise.

❑ **Luke Air Force Base**

The 1992 noise contour for Luke shows an impact primarily to areas with mixed land uses, with significant impacts on areas planned for single and multi-family residential uses as well as areas with commercial uses. The Military Airport Disclosure map for Luke defines the “territory” as extending for 10 miles to the north to the area of Deer Valley Drive; 10 miles to the south to the area of Indian Springs Road; 10 miles to the west to the western edge of White Tank Park; and, 4 miles to the east to the area near the Agua Fria River. The Public Affairs Office is the initial community contact for aircraft noise and sonic boom complaints. Luke has made a number of changes to operating procedures and flight paths to reduce the noise impacts as pilots depart and return from training areas flying the F-16 Fighting Falcon. For example, while pilots train to fly in all weather conditions, Luke plans for most night training missions to return by 10:00 PM. Luke maintains a website with links to contact information regarding noise complaints in the vicinity of the Base.

❑ **Memorial**

The noise contour for Memorial under the Status Quo alternative shows an impact primarily to undeveloped areas. Noise impacts may occur to the north in areas along Queen Creek Road; to the south in areas along Riggs Road; to the west and beyond Interstate 10; and, to the east in areas near Price, Ocotillo, and Chandler Heights Roads. Secondary impacts include areas to the north, south and west that are planned for open space and commercial land uses, and to the east in areas planned for mixed and single-family residential land uses. The new Sun Lakes retirement area is located southeast of Memorial. No incompatible uses were identified within the primary area.

❑ **Mesa Falcon Field**

The noise impact area for Mesa Falcon Field under the Status Quo alternative shows an impact primarily on areas planned for medium low residential and mixed land uses. Noise impacts may occur as far north as the Salt River Pima-Maricopa Native American Community; to the south along Main Street; to the west near areas along Gilbert Road; and to the east along the Red Mountain Freeway. Secondary impacts include significant areas planned for medium low density and medium density residential land uses in addition to areas planned for commercial and other employment center land uses. Roughly 60 percent of primary noise impacts affect uses considered non-compatible with airport-related noise. The City of Mesa General Plan has designated surrounding land uses for compatibility within two areas, one of principal concern (65 DNL) and one of general concern (60 DNL) for planning purposes.

❑ **Phoenix – Deer Valley**

The noise impact area for Deer Valley under the Status Quo alternative shows an impact primarily on areas planned for single-family residential uses and undeveloped areas. Noise impacts may occur to the north beyond Happy Valley Road; to the south near Union Hills Drive; to the east in areas along Pinnacle Peak Road; and, to the west in areas near 43<sup>rd</sup> Avenue. Secondary impacts include areas planned for single-family residential uses, along with commercial, multi-family residential and mixed uses and other employment centers. There may also be potential impacts on several areas planned for open space. Roughly 30 percent of primary noise impacts affect uses considered non-compatible with airport-related noise.

❑ **Phoenix – Goodyear**

The noise contour for Goodyear under the Status Quo alternative shows an impact primarily on areas planned for mixed land uses. Noise impacts may occur to the north in areas along Van Buren Street; to the south of Broadway Road in areas along Bullard Avenue; as far east as the intersection of Western Avenue and Dysart Road; and west to areas along Sarival Avenue. Secondary impacts include significant areas planned mixed land uses, along with others planned for commercial and

single-family residential uses. There is limited impact on undeveloped areas. Roughly 20 percent of primary noise impacts affect uses considered non-compatible with airport-related noise.

❑ **Phoenix – Sky Harbor International**

The noise contour for Sky Harbor under the Status Quo alternative shows an impact primarily on areas planned for industrial and mixed land uses. Noise impacts may occur to the west in areas along 7<sup>th</sup> Avenue and to the east along Hayden Road. Noise impacts may also occur to the north beyond Loop 202 and to the south beyond Interstate 10 in areas planned for single-family and multi-family residential uses along with areas planned for industrial, mixed, and commercial land uses. Less than 10 percent of primary noise impacts affect uses considered non-compatible with airport-related noise. Since the opening of the third runway, Sky Harbor has experienced an increase of requests for information, prompting the introduction of a noise information program for disseminating information about the airport. Available on the airport's website are data regarding operations and runway use, as well as links to the latest FAR Part 150 Airport Noise and Land Use Compatibility Study, and the 1992 Noise Contour Map. Other efforts to address noise issues at the airport include the Residential Sound Assistance Program, which replaces doors and window and can include additional insulation and other sound mitigating changes for affected residences; and the Community Noise Reduction Program, which focuses on pilot and community education and outreach. The airport also still has in place a 1994 Intergovernmental Agreement between the cities of Phoenix and Tempe that relates to the flight path of aircraft departing to the east for noise purposes. The airport is in the process of purchasing and relocating residences located within identified noise sensitive areas.

❑ **Pleasant Valley**

The noise contour for Pleasant Valley under the Status Quo alternative shows an impact primarily on areas planned for commercial land uses areas. Noise impacts may occur as far north as the Morristown-New River Highway, to the west in areas along the Agua Fria River and to the east along the New River. Secondary impacts may include areas planned for single and multi-family residential uses, along with areas planned for open space, commercial, mixed and other employment center land uses. Less than 10 percent of primary noise impacts affect uses considered non-compatible with airport-related noise.

❑ **Scottsdale**

The noise contour for Scottsdale under the Status Quo alternative shows an impact primarily on areas planned for commercial uses and other employment centers. No incompatible uses have been identified by the airport within its 65 DNL contour. Noise impacts may occur as far north as the Loop 101; to the south in areas along Cactus Road; to the west along 64<sup>th</sup> Avenue; and, to the east in areas along Frank Lloyd Wright Boulevard. Secondary impacts may include significant areas planned for single-family residential land uses, along with other areas planned for mixed, commercial, office, open space and other employment uses. Less than 10 percent of primary noise impacts affect uses considered non-compatible with airport-related noise. To address issues of noise, the City of Scottsdale maintains current information on their website, including the “Fly Neighborly Program,” an ongoing noise abatement and pilot education effort, and links to information regarding upcoming events such as an FAA Safety and Noise Abatement pilot seminar. The airport has appointed the Advisory Subcommittee on Noise Issues that has developed a pilot/community education and outreach program to advocate the use of abatement programs, along with the new “Noise Abatement Pledge” program and a voluntary curfew. The City has also made information regarding aircraft flight paths, procedures and altitudes readily accessible, along with a link to the Executive Summary of the FAR Part 150 Airport Noise and Land Use Compatibility Study.

❑ **Sky Ranch Carefree**

The noise contour for Sky Ranch Carefree under the Status Quo alternative shows an impact primarily on areas planned for single-family and multi-family residential, commercial, and other employment center land uses. The airport is a residential airpark with homes located within its boundaries. Noise impacts may occur to the north in the vicinity of Tom Morris Road; to the south in areas along Pima Road; to the west in areas near the intersection of Stagecoach Pass and Tom Darlington Drive; and to the east in areas along Cave Creek Road. Secondary impacts include



significant areas planned for single-family residential land uses, along with multi-family residential, commercial, mixed and other employment center land uses. Roughly 40 percent of primary noise impacts affect uses considered non-compatible with airport-related noise.

❑ **Stellar Airpark**

The noise contour for Stellar under the Status Quo alternative shows an impact primarily on undeveloped areas, with limited impact on single-family residential uses. Noise impacts may occur to the north beyond Ray Road and well into the Gila River Native American Community to the south. Potential noise impacts may also occur to the east of Loop 101/Price Road, and to the west in areas along Kyrene Road. Secondary impacts include areas primarily planned for single-family residential land uses, along with northern areas of the Gila River Native American Community. Other secondary impacts may occur in areas planned for multi-family residential, commercial and other employment land uses. Roughly 70 percent of primary noise impacts affect uses considered non-compatible with airport-related noise, however, a majority of these uses are residences located on the airpark.

❑ **Wickenburg Municipal**

The noise impact area for Wickenburg under the Status Quo alternative shows an impact primarily on areas planned for industrial land uses and other employment centers. Noise impacts may occur to the west in areas along US 60 and to the east, beyond the intersection of Vulture Mine Road and US 60. Potential impacts may include areas planned for single-family residential and industrial land uses, in addition to areas planned for multi-family residential, commercial and other employment center land uses. The airport maintains a website that informs pilots about operational procedures and the presence of homes to the south, east and north of the airport. Less than 10 percent of primary noise impacts affect uses considered non-compatible with airport-related noise.

❑ **Williams Gateway**

The noise impact area for Williams Gateway under the Status Quo alternative shows an impact primarily on areas planned for mixed and commercial land uses. Noise impacts may occur as far north as the intersection of Power and Warner Roads and as far south as areas along Ellsworth Road, south of Germann Road. Potential noise impacts may also occur to the west in areas along Williams Field Road. Secondary impacts include areas planned for single-family and multi-family residential, mixed, commercial, industrial, and other employment land uses. Less than 10 percent of primary noise impacts affect uses considered non-compatible with airport-related noise. The airport maintains a website for disseminating information including current and future operations, noise, and environmental issues. While the airport does not have any noise restrictions in place, they have developed voluntary *Fly Friendly* procedures that are encouraged for use by pilots. The website also provides valuable information regarding schools built with attenuation measures, along with information about airport disclosures for existing residents and potential homebuyers, and contact information for submitting a noise complaint.

The Status Quo alternative can be summarized as a “do-nothing” approach, where no projects other than those already programmed are included in the analysis. The overall noise impact of the Status Quo alternative, on future land uses is estimated to affect roughly 23,000 acres of land, most of which is in Maricopa County. Future land uses impacted by Luke AFB are not included in this calculation however its impact alone is estimated at more than 22,000 acres. The Status Quo alternative can be anticipated to affect significant portions of mixed land use areas, including commercial, single-family and multi-family residential uses. These impacts set the baseline for analysis of subsequent alternatives in which more significant airport development is evaluated and are projected to result even if no additional airport development, beyond what is already programmed, occurs in the MAG Region.

As described above, many of the airports in the Regional system have developed noise abatement programs and practices that attempt to address the concerns of residents and business owners in areas surrounding these airports. In many cases, however, noise issues and complaints have been registered from areas outside the extent of the 65 DNL noise contours. In some instances, these issues relate to aircraft that are more than five miles from the airport that receives the complaint. This issue is considered

more of an “overflight” issue due to its impact beyond the typical airport environs. Areas that do not fall within the 65 DNL noise contours are not considered within the FAA’s definition of a noise impacted areas, and are not eligible for FAA noise attenuation monies. Therefore, affected parties have limited recourse through the FAA. Arizona’s Public Airport Disclosure statute attempts to address some of these issues by defining an area much larger than the 65 DNL noise contour boundaries, including traffic pattern airspace, where the location and noise conditions of the airport must be disclosed to residences.

### Improved Technology Alternative

Under the Improved Technology alternative, it is anticipated that airport and airspace capacity would be improved due to the implementation of proposed technological and procedural changes over the next 10 years. Some of these changes include items such as improved precision approaches, widespread use of Free Flight tools, optimized airspace design, reduced vertical separation, enhanced navigation procedures, improved data communications and satellite navigation, and enhanced surveillance. These improvements are expected to be realized throughout the system, but most importantly at commercial service airports and airports that have high levels of corporate jet traffic such as Scottsdale and Williams Gateway. The FAA’s benchmark studies conducted to assess the potential benefits of this improved technology at Phoenix-Sky Harbor International Airport indicate that airspace capacity could be enhanced by approximately 4 percent.

While the Improved Technology alternative has the potential to enhance operational capacity within the Region, there is currently no plan to change the configuration of the airports to accommodate the implementation of the technology. It is anticipated that procedural changes could be realized, but at this point there is no means for determining what those changes could be, nor what their impact would be as it relates to noise. Changes in procedures could result in reduced noise impacts if the procedures keep aircraft at higher altitudes longer. Changes resulting from implementation of airspace redesign, such as Northwest 2000, have resulted in additional noise complaints in areas that were not historically impacted by noise. At this time, however, there is no means for evaluating the noise impact that would result from implementing improved technology at the airports in the MAG Region. Therefore, it is assumed that the noise impacts that would result from the Improved Technology alternative would be the same as those for the Status Quo alternative.

### Maximized Airport Development Alternative

The Maximized Airport Development alternative includes the development of additional facilities at many of the Region’s airports to provide additional operating capacity. Under this alternative, additional runways would be provided at four airports (Phoenix-Deer Valley, Phoenix-Goodyear, Phoenix-Sky Harbor International, Williams Gateway), longer runways would be provided at three airports (Buckeye, Chandler, Wickenburg), and precision instrument approaches, either new or additional, would be developed at nine airports (Buckeye, Chandler, Glendale, Mesa, Phoenix-Deer Valley, Phoenix-Goodyear, Phoenix-Sky Harbor International, Scottsdale, Williams Gateway). In addition, the alternative includes the restoration of the runway at Memorial and development of a paved runway at Pleasant Valley. In terms of a noise impact, the development of runway improvements, including extensions to existing runways, paving, or development of additional runways, all have the potential to result in additional noise impacts. For purposes of this analysis, the provision of a precision instrument approach was not assumed to have a noise impact, but could actually result in a positive impact as aircraft would be put in a specific flight path using instrumentation to guide them during approach.

Similar to the Status Quo alternative in which noise impact areas were developed for the three airports with currently programmed projects (Buckeye, Glendale, and Wickenburg), noise impact areas were also developed for the Maximized Airport Development alternative for those airports with runway improvements identified as part of the alternative. These runway improvements were identified in the

existing mapping, and noise impact areas were developed to encompass the anticipated project as well as the expanded area that was anticipated to incur noise impacts as a result of the runway project. To account for different noise levels generated by different aircraft types, the projected operational fleet mix for the airports with runway projects in the Maximized Airport Development alternative was considered. For example, airports that were identified to have longer runways sufficient to accommodate business jet traffic were anticipated to attract more sophisticated aircraft that typically have larger noise impacts. Therefore, the noise impact areas for these airports were assumed to increase based on the projected operating fleet. For the new runways that were included as part of the alternative, noise impact areas were also developed to encompass where the runways could be developed as well as potential areas that could be impacted beyond the airport environs as a result of the additional runway. The noise impact areas for the additional runways were developed by examining the existing noise contours and the projected operating fleet mix for the airports.

**Table 5.3** shows for which airports noise impact area “boxes” were developed under the Maximized Airport Development Alternative.

**Table 5.3**  
**Maximized Airport Development Alternative**  
**Noise Impact Areas (“Boxes”)**

<b>Airport Name</b>	<b>Future Noise Contour</b>			<b>RASP</b>	<b>Future Noise Impact Area “Boxes”</b>
	<b>Source</b>	<b>Year</b>	<b>Ops</b>	<b>2025 Ops</b>	
Buckeye Municipal	1993 EA	2013	148,400	215,200	X
Chandler Municipal	Part 150	2020	294,300	514,500	X
Estrella Sailport	1993 RASP	2015	53,600	16,500	-
Gila Bend Municipal	1993 RASP	2010	57,300	57,800	-
Glendale Municipal	1998 EA	2015	215,000	197,000	-
Memorial	Master Plan	2015	39,000	5,500	-
Mesa Falcon Field	Master Plan	2015	349,600	472,100	-
Phoenix - Deer Valley	Master Plan	-	520,000	640,600	X
Phoenix - Goodyear	Master Plan	1999	320,000	334,200	X
Phoenix - Sky Harbor International	Part 150	2015	773,070	724,400	X
Pleasant Valley	1986 RASP	2005	107,000	134,300	-
Scottsdale	Part 150	2015	250,700	262,600	-
Sky Ranch Carefree	1986 RASP	2005	26,000	13,000	-
Stellar Airpark	1986 RASP	2015	200,000	78,400	-
Wickenburg Municipal	1999 EA	2020	38,690	38,100	X
Williams Gateway	Part 150	2020	338,200	420,300	X

Source: Wilbur Smith Associates

**Exhibit 5.3** depicts the potential noise impacts on future land uses that may be associated with the Maximized Airport Development alternative. The impacts described in this section consider new and expanded runways as presented in Working Paper No. 4.

The Maximized Airport Development alternative can be characterized as an approach where improvement projects are maximized at existing airport facilities. The overall noise impact of the Maximized Airport Development alternative on future land uses is estimated to affect roughly 41,000 acres of land primarily in Maricopa County – an increase of nearly 18,000 acres from the Status Quo alternative. Some of the increase in acres will result in additional impacts to uses considered incompatible with airport-related

noise, however, much of the increase is anticipated to impact compatible uses. Potential noise impacts on future land uses would still be greater than those under the Status Quo alternative.

### New Airport Development Alternative

The New Airport Development alternative assumes that the Status Quo projects (runway extensions at Buckeye, Glendale, and Wickenburg), but no other major runway development at existing airports. The primary focus of this alternative is to analyze the impact of developing new airports in the MAG Region to serve projected demand through providing additional capacity. Previous analyses included four general aviation airport options as well as three commercial service options (including use of the existing Williams Gateway Airport as a commercial facility). For purposes of the analysis of the New Airport Development alternative, it is assumed that one new general aviation and one new commercial service airport would be developed in the Region, however, the analysis examines the potential impacts of the four proposed general aviation and three commercial airports.

Several assumptions were necessary to evaluate the New Airport Development alternative. For the general aviation airports, a 6,000-foot long runway with a full parallel taxiway was assumed. For the two new commercial sites, a 9,000-foot long runway with a full parallel taxiway was assumed. In order to assess the potential noise impacts that could result from development of new airports, operations also had to be assigned to the new sites. To develop these operational demand assignments, each of the new airport locations was considered independently, with existing nearby airports, locations of existing pilots, and population densities included in the evaluation process. It was assumed that a new airport would take demand from existing airport sites and the 2025 RASP projections were used to determine the number of operations that would be relocated to the new sites. A brief discussion of the new airport assumptions for the demand allocation is provided below.

#### ❑ **New Forepaugh GA**

The new Forepaugh Airport is considered a replacement airport for the existing Wickenburg Municipal Airport. This replacement airport is actually located west of the existing airport, which is currently not experiencing a high level of activity. Based on the limited number of existing pilots and the airport's distance from the major population centers, the RASP has assumed that the new Forepaugh Airport will serve only as a replacement and will not attract additional demand from other airports in the existing airport system.

#### ❑ **New Peoria GA**

The new Peoria Airport is located on the existing Pleasant Valley Airport site, north of Phoenix. While the existing site is not located near a current large population base, the area south of the airport site and within a 30-minute drive of the airport is more heavily populated. Existing system airports that are within proximity to the site include Phoenix-Deer Valley, Glendale Municipal, and Scottsdale. The following demand was assumed to relocate from these airports to the new site: Phoenix-Deer Valley (25%), Glendale Municipal (20%), Scottsdale (20%) for a total of 252,000 annual operations.

#### ❑ **New East Valley GA**

A new East Valley site was identified in the vicinity of Highway 87, east of Fountain Hills and northeast of the Salt River Pima-Maricopa Indian Community. This site is located north and east of a significant population base. Existing system airports that are within proximity to the site include Mesa Falcon Field, Scottsdale, and Phoenix-Deer Valley. The following demand was assumed to relocate from these airports to the new site in the East Valley: Mesa Falcon Field (20%), Scottsdale (20%), and Phoenix-Deer Valley (15%) for a total of 243,000 annual operations.

#### ❑ **New South Valley GA**

A new South Valley site was identified just south of the Maricopa County border, along the I-10 corridor in Pinal County. This site is located in the Gila River Indian Community and south of one of the rapidly growing areas in Maricopa County with a significant population base. Existing system

airports that are within proximity to the site include Chandler Municipal, Mesa Falcon Field, and Williams Gateway. The following demand was assumed to relocate from these airports to the new site in the South Valley: Chandler Municipal (25%), Mesa Falcon Field (5%), and Williams Gateway (15%) for a total of 215,300 annual operations.

❑ **New North Commercial**

The new North Commercial site was identified west of the new Peoria site in the north central part of Maricopa County. This site was identified by the City of Phoenix through a cursory analysis of long-range planning needs, including airspace requirements for another commercial airport in the Region. For the RASP, this site was assumed to accommodate some commercial traffic, as well as a significant level of general aviation traffic in what would be the initial years of the airport's opening. To derive a potential demand estimate, it was assumed that a secondary commercial airport in the Region could capture approximately 100 commercial airline departures per day, as well as general aviation traffic from nearby airports such as Phoenix-Deer Valley (20%), Glendale Municipal (15%), and Scottsdale (15%) for a total of 206,500 annual operations.

❑ **New Regional Airport Feasibility Assessment (RAFA) Commercial**

The new RAFA Commercial site was studied by the Governor's Regional Airport Advisory Committee (GRAAC) in 1993. This study evaluated the need for a Regional airport to supplement the commercial activity projected at Phoenix-Sky Harbor International. The study identified two potential locations, including Williams Gateway (which at the time had just been slated for closure in its former role as an air force base) and north of Casa Grande. For purposes of the RASP, the new RAFA Commercial site has been sited in Casa Grande. To derive a potential demand estimate, it was assumed that the RAFA Commercial site would serve as a secondary commercial airport in the Region and could capture approximately 100 commercial airline departures per day, as well as general aviation activity in the Region. Based on its very southern location, this site was assumed to be capable of attracting approximately half of the general aviation activity that would be captured with the new South Valley general aviation airport, which was noted to get demand from Chandler Municipal, Mesa Falcon Field, and Williams Gateway. The commercial and general aviation activity at the new RAFA Commercial site would total approximately 180,500 annual operations.

❑ **Supplemental Williams Commercial**

Williams Gateway Airport currently operates a limited level of commercial activity, but has been identified by the previously noted RAFA study and by Regional officials as a prime candidate for a supplemental commercial service airport in the Phoenix metropolitan area. The existing forecasts prepared by the airport and included in the RASP identified approximately 50,000 commercial airline operations. With these forecasts, no adjustments to anticipated activity levels are needed to address Williams Gateway as a supplemental commercial service airport.

**Exhibit 5.4** depicts the potential noise impacts on future land uses that may be associated with the New Airport Development alternative. The following descriptions summarize the types of land uses that may be impacted as a result of implementing the New Airport Development alternative, by impacted airport. Only those existing airports that were anticipated to experience a reduction in activity as a result of the development of a new airport are discussed.

❑ **Chandler Municipal**

The noise impact area for Chandler under the New Airport Development alternative indicates a reduced impact on undeveloped areas and on areas with mixed land uses. There also appears to be a reduced impact on commercial uses and other employment centers that were identified as impacted under the Status Quo alternative. There does not appear to be a significant reduction in the percent of primary noise impacts affecting uses considered non-compatible with airport-related noise.

❑ **Glendale Municipal**

The noise impact area for Glendale under the New Airport Development alternative indicates a reduced impact on areas with mixed land uses and undeveloped areas, with a limited impact on commercial and single-family residential uses that were identified as impacted under the Status Quo

alternative. There does not appear to be a significant reduction in the percent of primary noise impacts affecting uses considered non-compatible with airport-related noise.

❑ **Mesa Falcon Field**

The noise impact area for Mesa under the New Airport Development alternative indicates a reduced impact on areas with mixed land uses and undeveloped areas, along with reduced impacts on commercial and single-family residential uses that were identified as impacted under the Status Quo alternative. There does not appear to be a significant reduction in the percent of primary noise impacts affecting uses considered non-compatible with airport-related noise.

❑ **Phoenix – Deer Valley**

The noise impact area for Deer Valley under the New Airport Development alternative indicates a reduced impact on multi-family and single-family residential uses, along with reduced impacts on areas with mixed land uses that were identified as impacted under the Status Quo alternative. There does appear to be a modest reduction in the percent of primary noise impacts affecting uses considered non-compatible with airport-related noise.

❑ **Scottsdale**

The noise impact area for Scottsdale under the New Airport Development alternative indicates a reduced impact on other employment areas, undeveloped areas, office and commercial land uses that were identified as impacted under the Status Quo alternative. The estimated noise impact area covers approximately 526 acres of land, a decrease of approximately 132 acres from the Status Quo alternative. There does not appear to be a significant reduction in the percent of primary noise impacts affecting uses considered non-compatible with airport-related noise.

❑ **New Forepaugh GA**

The noise impact area for the New Forepaugh site under the New Airport Development alternative indicates an impact to primarily single-family residential uses. The estimated noise impact area covers approximately 186 acres of land.

❑ **New Peoria GA**

The noise impact area for the New Peoria site under the New Airport Development alternative indicates an impact primarily on single-family and multi-family residential uses, with significant impacts on commercial land uses and areas with mixed land uses and undeveloped areas. The estimated noise impact area covers approximately 931 acres of land, an addition of 865 acres to those areas impacted by Pleasant Valley under the Status Quo alternative.

❑ **New East Valley GA**

The noise impact area for the New East Valley site under the New Airport Development alternative indicates an impact primarily on undeveloped areas with a minimal impact on single-family residential uses. The estimated noise impact area covers approximately 928 acres of land.

❑ **New South Valley GA**

The noise impact area for the New South Valley site under the New Airport Development alternative indicates an impact primarily future land uses in Pinal County. The estimated noise impact area covers approximately 928 acres of land.

❑ **New North Commercial**

The noise impact area for the New North Commercial site under the New Airport Development alternative indicates an impact primarily on undeveloped areas and single-family residential uses, with a minimal impact on commercial uses. The estimated noise impact area covers approximately 928 acres of land.

❑ **New RAFA Commercial**

The noise impact area for the New RAFA Commercial site under the New Airport Development alternative indicates an impact primarily on future land uses in Pinal County. The estimated noise impact area covers approximately 928 acres of land.

❑ **Supplemental Williams Commercial**

The noise impact area for the Supplemental Williams Commercial site under the New Airport Development alternative indicates an impact on areas with mixed and commercial land uses, with limited impact on single-family residential uses. The estimated noise impact area covers

approximately 4,497 acres of land, an addition of 440 acres to those areas impacted by Williams Gateway under the Status Quo alternative.

The New Airport Development alternative, as discussed above, considers the development of new general aviation and commercial service airports. While the New Airport Development alternative does consider expansion opportunities at existing facilities including Pleasant Valley (New Peoria) and Williams Gateway, and/or replacement of Wickenburg Municipal with the New Forepaugh general aviation airport, no other improvements at existing facilities are included. The overall noise impact of the New Airport Development alternative on future land uses is estimated to affect roughly 23,000 acres of land primarily in Maricopa County – depending on which sites were developed. This represents nearly the same level of acres impacted under the Status Quo alternative, assuming development of one new general aviation airport and one new commercial service airport. While new areas would be affected by new airport development considered in this alternative, these new facilities would likely cause a reduction in the size of areas impacted by noise at several existing airports. The New Airport Development alternative can be anticipated to affect new and significant portions of multi-family residential, commercial, and single-family residential uses in the future. The areas impacted by noise vary based on the degree to which these areas are actually developed in the future and depend greatly upon the design and configuration of these new facilities.

#### Summary of Noise Evaluation

The noise evaluation of the four alternatives indicates that both the Status Quo and Improved Technology alternatives have the most limited noise impact on future land uses in Maricopa County. As noted above, the Status Quo alternative impacts roughly 23,000 acres of land, including single and multi-family residential areas to those with commercial and mixed uses. **Table 5.4** compares the noise evaluation for each of the four alternatives.

The Status Quo alternative is considered to have a limited impact, as it is a “do-nothing” scenario, where no changes to the current system infrastructure are represented. Under this alternative, increases in activity may heighten the level of noise impacts, however, these increases would not be driven by system development, since increasing aviation activities will likely occur regardless of which alternative is selected. For all practical purposes, the Status Quo alternative can be characterized as the existing conditions, where the noise impacts are relatively similar to those experienced at the time of this study.

It is important to note that the same level of demand is projected under the Status Quo alternative as in the other alternatives. As previously noted in other working papers, the projected level of delay is expected to be significant, indicating aircraft will be awaiting arrival and departure longer. This will mean aircraft will be in the pattern and overflying longer since they will be delayed in landing. Overflight is not measured in the FAA’s methodology for noise impact analysis. Overflight was noted in several of the individual airport planning efforts to be of concern to area residents.

The noise evaluation of the Maximized Airport Development alternative shows that the improvement projects considered would have the most significant noise impact on future land uses in Maricopa County. As noted above, the Maximized Airport Development alternative impacts more than 41,000 acres of land ranging in use from single and multi-family residential areas to those with commercial uses. This alternative represents a substantial increase in the amount of land impacted by noise in the Status Quo alternative, nearly an additional 18,000 acres.

As shown in Table 5.4, significant increases in noise impacts to non-compatible land uses may be found at Phoenix-Deer Valley and Phoenix-Sky Harbor International under the Maximized Airport Development alternative, where improvements include the addition of parallel runways in areas

**Table 5.4**  
**Comparison of Noise Impacts by Alternative**

Airport Name	Status Quo		Improved Technology		Maximized Airport Development		New Airport Development	
	Acres	%NC	Acres	%NC	Acres	%NC	Acres	%NC
Buckeye Municipal	243	10%	243	10%	297	10%	243	10%
Chandler Municipal	578	10%	578	10%	678	10%	503	10%
Estrella Sailport	48	70%	48	70%	48	70%	48	70%
Gila Bend Municipal	104	0%	104	0%	104	0%	104	0%
Glendale Municipal	864	10%	864	10%	864	10%	778	10%
Memorial	83	0%	83	0%	83	0%	83	0%
Mesa Falcon Field	3,053	60%	3,053	60%	3,053	60%	2,656	60%
Phoenix - Deer Valley	3,528	30%	3,528	30%	6,717	40%	2,822	30%
Phoenix - Goodyear	1,768	20%	1,768	20%	3,611	20%	1,768	20%
Phoenix - Sky Harbor International	7,861	10%	7,861	10%	15,886	20%	7,861	20%
Pleasant Valley	66	10%	66	10%	66	10%	66	10%
Scottsdale	658	10%	658	10%	658	10%	526	10%
Sky Ranch Carefree	124	40%	124	40%	124	40%	124	40%
Stellar Airpark	57	70%	57	70%	57	70%	57	70%
Wickenburg Municipal	200	0%	200	0%	200	0%	200	0%
Williams Gateway	4,057	10%	4,057	10%	8,716	40%	4,057	10%
New East Valley GA	-	-	-	-	-	-	928	~10%
New Forepaugh GA	-	-	-	-	-	-	186	~10%
Peoria GA (Pleasant Valley)	-	-	-	-	-	-	931	~60%
New South Valley GA	-	-	-	-	-	-	928	N/A
New North Commercial	-	-	-	-	-	-	928	~40%
New RAFA Commercial	-	-	-	-	-	-	928	N/A
Supp.Comm. (Williams Gateway)	-	-	-	-	-	-	4,497	~10%
<b>Total</b>	<b>23,292</b>	<b>-</b>	<b>23,292</b>	<b>-</b>	<b>41,162</b>	<b>-</b>	<b>23,198 – 23,686</b>	

Source: Wilbur Smith Associates

%NC = Percentage of total acreage impacted that are considered as non-compatible land uses.

containing significant amounts of existing residential land or areas planned for residential uses. The proposed parallel runway at Goodyear does not have a similar affect. Due to this considerable increase in land area, and the extent to which these areas contain residential land uses, the Maximized Airport Development alternative is considered to have a significant noise impact.

The evaluation of the New Airport Development alternative shows that the expansion of existing airport facilities and development of new airports considered would have a moderate noise impact on future land uses in Maricopa County. Two of the new airport sites are located outside Maricopa County and the noise impact of these sites was not determined because land use data for Pinal County was not available. The New Airport Development alternative would likely impact an amount of land in a range of roughly 23,200 – 23,700 acres. These areas contain single and multi-family residential areas to commercial and mixed land use areas, depending upon which new airport sites would be developed. As mentioned previously, this range represents the construction of one new general aviation airport and one new commercial service airport. In the event that Williams Gateway Airport is chosen to become the Supplemental Commercial facility, only one other new general aviation airport will be considered.



Since several of the new airport sites are in areas that have not historically been subject to aircraft noise related issues, the impact on non-compatible land uses would be more significant than the Status Quo alternative. Due to this potential for impact on new areas, the New Airport Development alternative is considered to have a moderate noise impact. **Table 5.5** indicates the summary of this noise evaluation.

**Table 5.5**  
**Summary of Noise Evaluation**

<b>Evaluation Criteria</b>	<b>Status Quo</b>	<b>Improved Technology</b>	<b>Maximized Airport Development</b>	<b>New Airport Development</b>
Noise	□	□	■	▣

- Limited Impact  
 ▣ Moderate Impact  
 ■ Significant Impact

### ***Air Quality***

The second environmental issue that was evaluated as part of the RASP is air quality. Using MAG's Airport Emissions Model, air quality impacts were measured for the alternatives analysis. For the MAG RASP alternatives analysis, there are four alternatives being evaluated. These alternatives were developed to evaluate options for improving the Region's airport system and included a baseline scenario (Status Quo), improving technology, improving the existing airports, and building new airports (see Table 5.1 for a brief summary of the alternatives). The Improved Technology alternative will not greatly impact air quality in a manner that can be adequately modeled. It is anticipated that when technology improvements are made, the amount of time aircraft spend in the taxi/idle and approach modes will decrease, but to what extent is not known at this time. Therefore, air quality modeling could not be conducted for this scenario, and the impact was assumed to be the same as that under the Status Quo alternative. For the Maximized Airport Development alternative, the existing airport system is projected to remain, with additional runways being constructed to improve delay. It is anticipated that the amount of time that aircraft spend in the taxi/idle mode will be reduced if additional runway capacity is available, but with the same number of annual operations, the other modes (taxi/idle and approach) should be consistent with the Status Quo alternative. Under the first three alternatives including Status Quo, Improved Technology and Maximized Airport Development, the total number of aircraft operations conducted in the Region remains the same. Under these three alternatives, 2025 aircraft operations in the Region are projected to increase to between 4,273,800 under the low growth scenario, Scenario 1, and 4,441,500 under the high growth scenario, Scenario 2. The only airport that is projected to have a range of operations is Phoenix-Sky Harbor International in terms of commercial aircraft operations. Therefore, the potential air quality impacts associated with the first three alternatives are anticipated to be the same as each airport is expected to accommodate the same number of operations under the first three alternatives.

Only under the fourth alternative, New Airport Development, do the operations projected for each airport vary based on the addition of new airports into the Regional aviation system. Based on this assumption, two air quality modeling runs were prepared to determine the impacts associated with the first three alternatives. These two runs address the low growth scenario operations estimate and the high growth operations estimate.

Under the fourth alternative, operations from existing airports are reallocated to new airports to address operational capacity constraints identified in previous analyses. For purposes of this analysis, one new

general aviation airport and one new commercial service airport were modeled for the New Airport Development alternative. For modeling purposes, the north Phoenix commercial service site and the Peoria/Pleasant Valley general aviation site were selected. These two sites have the most potential to impact air quality in the Region based on their proximity to the metropolitan area. It is also important to note that the RASP is focusing on total emissions and not concentrations, therefore the primary purpose of modeling new airports is to determine the potential impact based on the addition of airports to the Region's existing airport system. Similar to the previous air quality runs, high and low scenarios were modeled to reflect the two projection scenarios for Phoenix-Sky Harbor International.

The two primary sources of aircraft emissions are exhaust emissions that come from engine fuel combustion and aircraft auxiliary power units, and evaporative emissions that come from aircraft refueling. Pollutants include hydrocarbons (HC), carbon monoxide (CO), oxides of nitrogen (NO<sub>x</sub>), and sulfur dioxide (SO<sub>2</sub>). The factors that affect aircraft exhaust emission rates include the mode of operation (such as taxi/idle, approach, takeoff, climbout), the duration of each operating mode, the fuel consumption rate, and factors related to the engine type.

To determine each airport's air quality impact, data on these factors was gathered. Questionnaires were distributed to airport sponsors to gather data on existing aircraft operations by aircraft type, fuel types and usage, and ground service vehicles (water service vehicles, tow/tug tractors, runway sweepers, forklifts, pick-up trucks, vans, golf carts). Data were requested based on year 2000, with extrapolation to 2025 based upon growth rates for activity projections from the MAG RASP. Follow up discussions were held with airport representatives, fixed-base operators, airlines, and air quality experts regarding the data and assumptions used for 2025.

The model produces a summary report which identifies total emissions for all airports included in the input file by major source type (i.e., ground service equipment, aircraft refueling, fuel storage, auxiliary power units, and aircraft). The report also summarizes total emissions by source category for each airport. These categories include commercial aircraft, general aviation, air taxi, military aircraft, auxiliary power units, ground service equipment, refueling, and fuel storage. The emissions that are summarized include the following:

- ❑ VOC – volatile organic compounds
- ❑ CO – carbon monoxide
- ❑ NO<sub>x</sub> – nitrous oxides
- ❑ SO<sub>2</sub> – sulfur dioxide

Table 5.6 presents a summary of the results of the air quality modeling.

**Table 5.6**  
**Summary of Air Quality Modeling Results**

<b>Alternative (SCENARIO)</b>	<b>VOC (English Tons)</b>	<b>CO (English Tons)</b>	<b>NO<sub>x</sub> (English Tons)</b>	<b>SO<sub>2</sub> (English Tons)</b>
<b>Status Quo/Improved Technology/Maximized Airport Development (LOW SCENARIO)</b>				
Ground Service Vehicles	0.5132	22.2340	1.7485	0.0550
Aircraft Refueling	0.0550	0.0000	0.0000	0.0000
Aircraft Fuel Storage	0.7764	0.0000	0.0000	0.0000
Aircraft	3.7363	66.2951	9.4002	0.3897
<b>TOTAL</b>	<b>5.0809</b>	<b>88.5291</b>	<b>11.1487</b>	<b>0.4447</b>
<b>Status Quo/Improved Technology/Maximized Airport Development (HIGH SCENARIO)</b>				
Ground Service Vehicles	0.6083	26.2934	2.0808	0.0653
Aircraft Refueling	0.0671	0.0000	0.0000	0.0000
Aircraft Fuel Storage	0.9480	0.0000	0.0000	0.0000
Aircraft	3.9830	67.8082	11.4224	0.4733
<b>TOTAL</b>	<b>5.6064</b>	<b>94.1016</b>	<b>13.5032</b>	<b>0.5386</b>
<b>New Airport Development (LOW SCENARIO)</b>				
Ground Service Vehicles	0.6106	26.3488	2.0946	0.0656
Aircraft Refueling	0.0671	0.0000	0.0000	0.0000
Aircraft Fuel Storage	0.9482	0.0000	0.0000	0.0000
Aircraft	3.6082	64.0629	10.2153	0.4183
<b>TOTAL</b>	<b>5.2341</b>	<b>90.4117</b>	<b>12.3099</b>	<b>0.4839</b>
<b>New Airport Development (HIGH SCENARIO)</b>				
Ground Service Vehicles	0.7071	30.5272	2.4240	0.0760
Aircraft Refueling	0.0793	0.0000	0.0000	0.0000
Aircraft Fuel Storage	1.1198	0.0000	0.0000	0.0000
Aircraft	3.8590	65.6194	12.1084	0.5007
<b>TOTAL</b>	<b>5.7652</b>	<b>96.1466</b>	<b>14.5324</b>	<b>0.5767</b>

Source: Maricopa Association of Governments

To evaluate the impact of the development of new airports, or the fourth alternative, a comparison of the impacts by source type was conducted, as well as a comparison of the low and high growth scenarios.

- ❑ Ground Service Vehicles – Under the Status Quo/Improved Technology/Maximized Airport Development alternative’s low growth scenario, VOC emissions from ground service vehicles are 0.5132 (English tons). Development of new airports (including a general aviation airport and a commercial service airport) in the Region under the low growth scenario increases the VOC emissions from ground service vehicles to 0.6106, or a 19 percent increase. Similar increases are anticipated for CO (18.5 percent), NO<sub>x</sub> (19.8 percent), and SO<sub>2</sub> (19.3 percent) under the low growth scenario for the New Airport Development alternative’s ground service vehicle emissions. Comparing the high growth scenarios for the Status Quo/Improved Technology/Maximized Airport Development alternative and the New Airport Development alternative, the following increases are anticipated for ground service vehicles: VOC (16.2 percent), CO (16.1 percent), NO<sub>x</sub> (16.5 percent), and SO<sub>2</sub> (16.4 percent).
- ❑ Aircraft Refueling – For aircraft refueling, only VOC emissions are calculated. Under the Status Quo/Improved Technology/Maximized Airport Development alternative’s low growth scenario, VOC emissions from aircraft refueling are 0.0550 (English tons). Development of new airports (including a general aviation airport and a commercial service airport) in the Region under the low growth scenario increases the VOC emissions to 0.0671, or a 22 percent increase. Comparing the high

growth scenarios for the Status Quo/Improved Technology/Maximized Airport Development alternative and the New Airport Development alternative, VOC emissions are projected to increase 18.2 percent.

- ❑ Aircraft Fuel Storage – Similar to aircraft refueling, for aircraft fuel storage, only VOC emissions are calculated. Under the Status Quo/Improved Technology/Maximized Airport Development alternative's low growth scenario, VOC emissions from aircraft fuel storage are 0.7764 (English tons). Development of new airports (including a general aviation airport and a commercial service airport) in the Region under the low growth scenario increases the VOC emissions to 0.9482, or a 22.1 percent increase. Comparing the high growth scenarios for the Status Quo/Improved Technology/Maximized Airport Development alternative and the New Airport Development alternative, VOC emissions are projected to increase 18.1 percent.
- ❑ Aircraft – Emissions related to aircraft operations comprise the majority of the VOC, CO, NO<sub>x</sub>, and SO<sub>2</sub> results for all of the scenarios and alternatives. Under the Status Quo/Improved Technology/Maximized Airport Development alternative's low growth scenario, VOC emissions from aircraft are 3.7363 (English tons). Development of new airports (including a general aviation airport and a commercial service airport) in the Region under the low growth scenario decreases the VOC emissions from aircraft to 3.6082, or a 3.4 percent decrease. Similar decreases are anticipated for CO (3.4 percent), while NO<sub>x</sub> is projected to increase 8.7 percent and SO<sub>2</sub> is projected to increase 7.3 percent under the low growth scenario for the New Airport Development alternative's aircraft emissions. Comparing the high growth scenarios for the Status Quo/Improved Technology/Maximized Airport Development alternative and the New Airport Development alternative, the following results are anticipated for aircraft: VOC (decrease of 3.1 percent), CO (decrease of 3.2 percent), NO<sub>x</sub> (increase of 6.0 percent), and SO<sub>2</sub> (increase of 5.8 percent). For these four factors, aircraft account for between 67 and 88 percent of the total emissions under all four modeling scenarios.
- ❑ Total Emissions – The four sources for emissions in MAG's Airport Emissions Model (ground service vehicles, aircraft refueling, aircraft fuel storage, aircraft) determine the total emissions for the four pollutants. The differences in the total emissions between the two low growth alternatives ranges from a 3.0 percent growth in the New Airport Development alternative's VOC, to a 10.4 percent growth in NO<sub>x</sub>. For the two high growth alternatives, increases range from 2.2 percent in CO to 7.6 percent in NO<sub>x</sub>.

The results of the air quality modeling have shown that by adding additional airports in the Region, an increase in pollutants will result. The increase is considered minor, with the highest increase projected to be a 10.4 percent increase in NO<sub>x</sub> in the low growth scenario when comparing the Status Quo/Improved Technology/Maximized Airport Development alternative to the New Airport Development alternative. The largest source of pollutants, aircraft operations, however, actually improve for VOC and CO under the New Airport Development alternative, even though total emissions increase. Therefore, the Status Quo, Improved Technology and Maximized Airport Development alternatives were determined to have a limited impact based on the results of the modeling. The New Airport Development alternative was determined to have a moderate impact since the total emissions are projected to increase over the combined Status Quo/Improved Technology/Maximized Airport Development alternative.

**Table 5.7** summarizes the evaluation of air quality.

**Table 5.7  
Summary of Air Quality Evaluation**

	Status	Improved	Maximized	New
Evaluation Criteria	Quo	Technology	Airport Development	Airport Development
Air Quality	□	□	□	■

- Limited Impact  
 ■ Moderate Impact  
 ■ Significant Impact

### **Costs/Economic Benefits**

Cost estimates were developed for each of the four alternatives by examining the types of facilities proposed for development within each alternative at the MAG system airports. Costs for facility development at comparable airports within the state of Arizona were evaluated to derive appropriate costs for specific development items, including paving, lighting, land acquisition, approach aids, etc. at the MAG System airports. A spreadsheet was developed itemizing the proposed facilities to be developed at each airport, by alternative. The respective costs were derived from ADOT's Five-Year Airport Development Program (FY 2003-2007), also referred to as the CIP, and were then applied to the associated facility development at each system airport. The costs for the individual airports were summed for each alternative in order to compare overall costs for the four alternatives. The cost comparisons for each alternative are in constant dollars, and were not inflated to future dollar values. The costs presented for the respective alternatives do not include environmental and facility planning costs that may be required for proposed development, but do include a 20 percent engineering and contingency fee.

This analysis focuses on the actual dollar cost of implementing the alternatives. The cost of not accommodating demand for aviation in the Region could also be considered. The analysis of delay, addressed in a subsequent section, associates a cost to users that results from not improving the Region's operational capacity.

#### Status Quo Alternative

It was assumed that the Status Quo alternative has no capital cost (\$0) since the projects included in this alternative are already programmed and this alternative serves as the baseline for comparison. No additional development beyond that identified in the current ADOT CIP would be undertaken in the Status Quo alternative.

#### Improved Technology Alternative

For the Improved Technology alternative, costs of equipment are primarily to aircraft and airports in the form of FAA facilities. Costs for instrumentation in the aircraft would be borne by the aircraft owners. Costs associated with facilities that would be installed by the FAA at the respective airports are not included in this alternative as those would not be borne in the Region. The significant facilities that would be associated with the Improved Technology alternative include flight management systems (aircraft owner), precision runway monitor (FAA), final monitor aid (FAA), offset ILS localizer directional aid (FAA), automated dependent surveillance/cockpit display of traffic information (aircraft owner), area navigation approaches (FAA), and wide area augmentation system (FAA). For these reasons, it was assumed that the cost of the Improved Technology alternative to the MAG Region is \$0.

### Maximized Airport Development Alternative

Cost estimates for the Maximized Airport Development alternative were estimated relative to the improvements identified for the airports. A general summary of the projects included in the Maximized Airport Development alternative was depicted in Table 5.1. Projects ranged from development of new runways to runway extensions, lighting, taxiway development, and aircraft storage. Unit prices were derived from ADOT's Five Year Airport Development Program FY 2003-2007. Airport-specific projects are included in **Appendix B. Table 5.8** summarizes the costs for each airport as part of the Maximized Airport Development alternative. The costs shown include the projects contained in the alternative (i.e. hangars) to accommodate demand through 2025.

**Table 5.8**  
**Summary of Airport Costs**  
**Maximized Airport Development Alternative**

<b>Airport Name</b>	<b>Total Cost</b>
Buckeye Municipal	\$5,749,000
Chandler Municipal	\$20,172,500
Estrella Sailport	\$138,000
Gila Bend Municipal	\$1,170,000
Glendale Municipal	\$7,080,000
Memorial	\$6,774,200
Mesa Falcon Field	\$23,989,200
Phoenix - Deer Valley	\$35,461,800
Phoenix - Goodyear	\$16,387,000
Phoenix - Sky Harbor International	\$1,684,308,600
Pleasant Valley	\$3,771,900
Scottsdale	\$9,324,100
Sky Ranch Carefree	\$5,523,500
Stellar Airpark	\$5,004,000
Wickenburg Municipal	\$1,644,000
Williams Gateway	\$361,276,600
<b>TOTAL</b>	<b>\$2,187,774,400</b>

Source: Wilbur Smith Associates

The estimated total cost for development of the Maximized Airport Development alternative is \$2.2 billion. The majority of this cost is related to development of facilities at Phoenix – Sky Harbor International including a fourth runway and terminal and vehicular parking expansion.

### New Airport Development Alternative

The costs to develop the airports identified as part of the New Airport Development alternative were calculated based on unit costs derived from ADOT's Five Year Airport Development Program FY 2003-2007. In addition, airport-specific master plans were reviewed to look at the estimated costs of specific projects such as hangars, lighting, and parking.

The facilities included in the cost estimates were as follows:

New General Aviation Airport

750 acres of land  
6,000-foot long runway  
Full parallel taxiway  
Runway and taxiway lighting  
Approach aids  
Access  
Utilities  
Storage facilities (250 spaces)  
Miscellaneous (fuel, FBO, parking, administration building)

New Commercial Service Airport

3,500 acres of land  
9,000-foot long runway  
Full parallel taxiway  
Runway and taxiway lighting  
Approach aids  
Terminal building (2.5 mil SF)  
Vehicle parking (5,600 spaces)  
Access  
Miscellaneous (fuel, FBO, ARFF)

A standard template for cost estimates was developed for use in comparing the alternatives in which issues such as possible environmental litigation, land acquisition costs, and site-specific planning were not addressed. Appendix B presents the detailed cost estimates by project for both the new general aviation and commercial service airports.

It is estimated that a new general aviation airport in the Phoenix Region would cost approximately \$62.7 million, including land acquisition and storage facilities for 250 based aircraft. Without the storage facilities, the cost is reduced to \$41.3 million, of which \$18.7 million is estimated for land acquisition. Typically, a new general aviation airport can be developed in the range of \$10 million, however, the proposed new general aviation airport has been identified in the metro area which increases the land acquisition costs, as well as includes significant storage facility costs.

A new commercial service airport, either the RAFA or a north commercial site, was estimated to cost approximately \$1.2 billion. The most costly item was terminal construction (\$687.5 million), while land acquisition was estimated at \$87.5 million. In comparison, cost estimates from recently constructed and planned commercial service airports range from \$400 million for the proposed new West Virginia Transpark to \$4.9 billion for Peotone, the proposed third Chicago-area airport. The new Denver International Airport was estimated to cost approximately \$5.3 billion.

Development of Williams Gateway as a supplementary commercial service airport in the Region would have a more limited initial cost. The airport recently constructed a terminal building, and has sufficient existing airside facilities to accommodate some commercial activity. In order for Williams Gateway to serve a role similar to the proposed new commercial service sites, additional terminal facilities and parking would need to be provided. These additional facilities are estimated to be approximately \$100 million. MidAmerica Airport, a military facility that was developed as a joint-use secondary commercial service airport east of St. Louis, constructed similar facilities to accommodate commercial activities at a cost of \$330 million.

In terms of the New Airport Development alternative, development of a new general aviation airport and a secondary commercial service airport could range from \$1.3 billion for two new facilities to \$162.7 million for a new general aviation and an upgraded Williams Gateway commercial airport.

Economic Benefits

Quantification of the costs of developing the alternatives is a significant factor in the evaluation process. In addition to costs, the economic benefits derived from aviation should also be considered. In 1998, the Arizona Department of Transportation Aeronautics Division conducted the *Aviation Economic Impact Study*. As part of this study, the economic impact of civil aviation in Maricopa County was quantified. According to the study's results, including multiplier impacts, the general aviation and commercial

service airports in Maricopa County are responsible for over 290,000 jobs, payroll of \$6.6 million, and economic activity of \$20.2 million.

Military impacts in Arizona were quantified as part of a 2002 study, *Economic Impact of Arizona's Principal Military Operations*". While not specific to military aviation activities in the MAG Region, the study did address the impacts of the five major military installations including Luke, Davis-Monthan, Fort Huachuca, Yuma Army Proving Grounds and Marine Corps Air Station. There were also four National Guard operations, two of which are in Phoenix (Air National Guard's 161<sup>st</sup> Air Refueling Wing and Army National Guard-Papago Park). These three Regional military facilities (Luke and the two National Guard units) are responsible for over 21,600 full-time equivalent jobs and \$1,592,744,000 in economic output.

The economic impact cannot be directly related to the four alternatives being evaluated as part of the RASP, but should be considered a positive benefit related to aviation development in the Region.

### Summary of Cost Evaluation

The Status Quo and Improved Technology alternatives obviously represent the lowest cost options with estimated costs of \$0. In comparison, the Maximized Airport Development alternative is projected to cost \$2.2 billion and the New Airport Development alternative in the range of \$162.7 million (for development of Williams Gateway as a supplementary commercial service airport and a new general aviation airport) to \$1.3 billion (for new commercial service airport and a new general aviation airport).

**Table 5.9** indicates the summary of this cost evaluation.

**Table 5.9**  
**Summary of Cost Evaluation**

<b>Evaluation Criteria</b>	<b>Status Quo</b>	<b>Improved Technology</b>	<b>Maximized Airport Development</b>	<b>New Airport Development</b>
Cost	□	□	■	▣

- Limited Impact  
 ▣ Moderate Impact  
 ■ Significant Impact

While the New Airport Development alternative is projected to cost more than the Maximized Airport Development alternative, with the amount of time it takes to develop new airport facilities, it is important to note that these costs will continue to escalate. In addition, depending upon the locations selected for development of new facilities, it is likely that land acquisition costs could be significantly higher than anticipated as part of this analysis. Development of new general aviation facilities in metropolitan areas such as Phoenix continues to become harder as urban development continues to push outward, limiting the availability of sufficient land to accommodate a new facility without impacting incompatible uses.

### **Delay**

Inadequate operational capacity, which ultimately leads to delay, was one of the most significant deficiencies identified in the RASP. Delay to airport users can be translated into a cost to the user and the system based on the projected level of activity for each airport. It is important to note that delay costs to users vary based on the type of activity. For example, the cost of delay to commercial aircraft is significantly greater than to aircraft being flown for training or recreation. Each airport's operational activity was examined to determine the level of activity by type in the base year. The resulting ratios of



activity to total airport operations were held constant through 2025 to derive the estimated delay cost associated with each alternative.

Industry-accepted operating costs for aircraft, by type, were applied to each alternative in order to quantify the total cost of aircraft delays associated with the respective alternative. These data were derived from a study developed by the FAA, entitled, “*Economic Values for Evaluation of FAA Investment and Regulatory Decisions*” (FAA-APO-98-8). Hourly operating costs for commercial aircraft by type (air carrier, commuter, and air cargo) were applied to the delay levels associated with respective commercial activity at the existing and proposed airports with commercial service (Sky Harbor, Scottsdale, Williams, and the proposed “New” commercial service airport). Likewise, the hourly costs of delay for general aviation aircraft by aircraft type (single-engine piston, multi-engine piston, turboprop, turbojet and rotorcraft) were applied to the delay associated with the respective aircraft operations at the airports, as well. The delay costs presented are in constant dollars.

The cost of aircraft delays borne by passengers were also calculated for each alternative. FAA data regarding the hourly values of passenger travel time were applied to the operating delays associated with each alternative to derive the cost of delays to passengers. The FAA recommends a combined hourly value of time for all passengers (business and personal uses) of \$26.70. Total passenger enplanements were multiplied by the average delay per operation, in minutes, for the specific airport to derive the total annual minutes of passenger delay for each individual airport. This number was converted into total annual hours of passenger delay, which was then multiplied by the FAA recommended value of passenger time to quantify the costs of airport associated delays on passengers. The total cost of airport delays were then calculated by summing the cost of aircraft and passenger delays for each alternative.

It should be noted that the costs of passenger delays were calculated for commercial airline passengers only. Passengers of general aviation aircraft would also incur costs associated with airport delays. However, there is no reliable way to calculate the numbers of passengers on general aviation aircraft. Therefore, the costs of passenger delays should be considered conservative, since they do not include the costs borne by passengers of general aviation aircraft.

#### Status Quo Alternative

**Table 5.10** presents the delay calculations for the Status Quo alternative. Delay is projected to range from over 28 million minutes to 44 million minutes depending on the operational growth projection used.<sup>1</sup> As previously discussed, the Status Quo alternative is the equivalent of a “do-nothing” alternative in which the Region’s most significant issue, operational capacity, is not addressed through development.

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<sup>1</sup> In Working Paper No. 2, two projections of demand were developed for Phoenix-Sky Harbor International. The first scenario was a low-growth scenario and the second was a high-growth scenario. Both scenarios were considered in the evaluation of potential delay costs associated with the alternatives analysis.

**Table 5.10**  
**Status Quo Delay Calculation**

Airport Name	2025			Avg. Annual
	Existing & 2025 ASV	Annual Operations	Annual Demand To ASV Ratio	Aircraft Delay (Minutes)
Buckeye Municipal	315,560	215,200	0.7	0.8
Chandler Municipal	460,000	514,500	1.1	5.6
Estrella Sailport	120,000	16,500	0.1	0
Gila Bend Municipal	212,797	57,800	0.3	0.2
Glendale Municipal	257,972	197,000	0.8	1.2
Memorial	100,000	5,500	0.1	0
Mesa Falcon Field	443,000	472,100	1.1	5.6
Phoenix-Deer Valley	606,000	640,600	1.1	5.6
Phoenix-Goodyear	304,916	334,200	1.1	5.6
Phoenix-Sky Harbor International (1)	139	174	1.3	15
Phoenix-Sky Harbor International (2)	139	214	1.5	30
Pleasant Valley	120,000	134,300	1.1	5.6
Scottsdale	200,000	262,600	1.3	15
Sky Ranch Carefree	174,000	13,000	0.1	0
Stellar Airpark	286,700	78,400	0.3	0.2
Wickenburg Municipal	245,000	38,100	0.2	0.1
Williams Gateway	410,000	420,300	1.0	2.8

Source: Wilbur Smith Associates

This delay was then translated into a cost based on the type of activity (local versus itinerant and general aviation versus commercial). Costs were assigned to the types of aircraft operations projected for 2025 to derive a total estimate of the cost of delay to both aircraft and passengers. The detailed calculations of the delay costs are presented in **Appendix C**. For the Status Quo alternative, 2025 delay is projected to cost between \$643 million (Scenario 1) and \$1.5 billion (Scenario 2).

#### Improved Technology Alternative

The Improved Technology alternative considers the implementation of proposed technological improvements that are intended to enhance the airspace and operational capacity of the airports. The primary reference used to evaluate the potential enhancements was the FAA's capacity benchmark analysis. The analysis discusses the potential for improvements primarily at large commercial service airports where aircraft operate under IFR. The anticipated impact on the MAG Region's airports is depicted in **Table 5.11**. Delay is projected to range from nearly 20 million minutes to 30 million minutes depending on the operational growth projection used. This represents a reduction of approximately 30 percent from the Status Quo alternative.

**Table 5.11**  
**Improved Technology Delay Calculation**

Airport Name	2025		Annual Demand To ASV Ratio	Avg. Annual Aircraft Delay (Minutes)
	ASV	Annual Operations		
Buckeye Municipal	325,000	215,200	0.7	0.8
Chandler Municipal	473,800	514,500	1.1	5.6
Estrella Sailport	120,600	16,500	0.1	0
Gila Bend Municipal	218,100	57,800	0.3	0.2
Glendale Municipal	265,700	197,000	0.7	0.8
Memorial	100,500	5,500	0.1	0
Mesa Falcon Field	456,290	472,100	1.0	2.8
Phoenix-Deer Valley	621,150	640,600	1.0	2.8
Phoenix-Goodyear	311,000	334,200	1.1	5.6
Phoenix-Sky Harbor International (1)	148	174	1.2	10
Phoenix-Sky Harbor International (2)	158	214	1.4	20
Pleasant Valley	120,600	134,300	1.1	5.6
Scottsdale	216,000	262,600	1.2	10
Sky Ranch Carefree	176,610	13,000	0.1	0
Stellar Airpark	291,000	78,400	0.3	0.2
Wickenburg Municipal	251,100	38,100	0.2	0.1
Williams Gateway	442,800	420,300	0.9	1.8

Source: Wilbur Smith Associates

This delay for the Improved Technology alternative was then translated into a cost based on the type of activity (local versus itinerant and general aviation versus commercial). Costs were assigned to the types of aircraft operations projected for 2025 to derive a total estimate of the cost of delay to both aircraft and passengers. The detailed calculations of the delay costs are presented in Appendix C. For the Improved Technology alternative, 2025 delay is projected to cost between \$430 million (Scenario 1) and \$1.0 billion (Scenario 2).

### Maximized Airport Development Alternative

The Maximized Airport Development alternative is proposed to address the Region's operational capacity deficiency through maximizing the existing airport system. Projects such as parallel runways and improved approaches are included in this alternative. **Table 5.12** presents the delay calculations for the Maximized Airport Development alternative. Delay is projected to range from over 13 million minutes to 18 million minutes depending on the operational growth projection used. This represents a reduction of approximately 52 to 59 percent from the Status Quo alternative.

**Table 5.12**  
**Maximized Airport Development Delay Calculation**

	2025		Annual Demand To ASV Ratio	Avg. Annual Aircraft Delay (Minutes)
	2025 ASV	Annual Operations		
Airport Name	ASV	Operations	To ASV Ratio	(Minutes)
Buckeye Municipal	325,000	215,200	0.7	0.8
Chandler Municipal	473,800	514,500	1.1	5.6
Estrella Sailport	120,600	16,500	0.1	0
Gila Bend Municipal	218,100	57,800	0.3	0.2
Glendale Municipal	265,700	197,000	0.7	0.8
Memorial	240,000	5,500	0.0	0
Mesa Falcon Field	510,000	472,100	0.9	1.8
Phoenix-Deer Valley	650,000	640,600	1.0	2.8
Phoenix-Goodyear	470,000	334,200	0.7	0.8
Phoenix-Sky Harbor International (1)	155	174	1.1	5.6
Phoenix-Sky Harbor International (2)	176	214	1.2	10
Pleasant Valley	230,000	134,300	0.6	0.6
Scottsdale	225,000	262,600	1.2	10
Sky Ranch Carefree	176,610	13,000	0.1	0
Stellar Airpark	286,700	78,400	0.3	0.2
Wickenburg Municipal	355,000	38,100	0.1	0
Williams Gateway	512,500	420,300	0.8	1.2

Source: Wilbur Smith Associates

This delay for the Maximized Airport Development alternative was then translated into a cost based on the type of activity (local versus itinerant and general aviation versus commercial). Costs were assigned to the types of aircraft operations projected for 2025 to derive a total estimate of the cost of delay to both aircraft and passengers. The detailed calculations of the delay costs are presented in Appendix C. For the Maximized Airport Development alternative, 2025 delay is projected to cost between \$251 million (Scenario 1) and \$518 million (Scenario 2).

### New Airport Development Alternative

The New Airport Development alternative is proposed to address the Region's operational capacity deficiency through development of additional airports. For purposes of this analysis, it is assumed that a new general aviation and an additional commercial service airport would be constructed in the Region. **Table 5.13** presents the delay calculations for the New Airport Development alternative. Delay is projected to range from over 10 million minutes to 19 million minutes depending on the operational growth projection used. This represents a reduction of approximately 56 to 63 percent from the Status Quo alternative.

**Table 5.13**  
**New Airport Development Delay Calculation**

Airport Name	Existing		Annual Demand To ASV Ratio	Avg. Annual
	ASV	Annual Operations		Aircraft Delay (Minutes)
Buckeye Municipal	325,000	215,200	0.7	0.8
Chandler Municipal	473,800	514,500	1.0	2.8
Estrella Sailport	120,600	16,500	0.1	0
Gila Bend Municipal	218,100	57,800	0.3	0.2
Glendale Municipal	265,700	157,600	0.6	0.6
Memorial	100,500	5,500	0.1	0
Mesa Falcon Field	456,290	472,100	1.0	2.8
Phoenix-Deer Valley	621,150	480,450	0.8	1.2
Phoenix-Goodyear	311,000	334,200	1.0	2.8
Phoenix-Sky Harbor International (1)	148	165	1.1	5.6
Phoenix-Sky Harbor International (2)	158	200	1.3	15
Pleasant Valley	120,600	134,300	1.0	2.8
Scottsdale	216,000	210,080	0.9	1.8
Sky Ranch Carefree	176,610	13,000	0.1	0
Stellar Airpark	291,000	78,400	0.3	0.2
Wickenburg Municipal	0	0	0.0	0
Williams Gateway	442,800	420,300	0.9	1.8
New GA Airport	325,000	252,000	0.8	1.2
New Commercial Airport	325,000	206,500	0.6	0.6

Source: Wilbur Smith Associates

This delay for the New Airport Development alternative was then translated into a cost based on the type of activity (local versus itinerant and general aviation versus commercial). Costs were assigned to the types of aircraft operations projected for 2025 to derive a total estimate of the cost of delay to both aircraft and passengers. The detailed calculations of the delay costs are presented in Appendix C. For the New Airport Development alternative, 2025 delay is projected to cost between \$231 million (Scenario 1) and \$851 million (Scenario 2). If Williams Gateway was used as a Supplemental Commercial airport and a new commercial airport was not constructed, this delay would increase since additional operational capacity would not be provided in the Region.

### Summary of Delay Evaluation

The delay costs for the four alternatives are summarized in **Table 5.14**. Under Scenario 1 (the low growth scenario for Phoenix-Sky Harbor International), the New Airport Development and Maximized

Development alternatives are comparable, with the Improved Technology nearly 86 percent higher and the Status Quo 178 percent higher than the New Airport Development delay cost.

**Table 5.14**  
**Comparison of Costs by Alternative**  
**Delay Evaluation**

Scenario	ESTIMATED DELAY COST			
	Status Quo	Improved Technology	Maximized Development	New Airports
Scenario 1	\$643,104,000	\$430,338,800	\$251,048,700	\$231,152,400
Scenario 2	\$1,515,098,800	\$1,011,608,600	\$518,418,500	\$850,677,000

**Table 5.15** indicates the summary of this delay evaluation.

**Table 5.15**  
**Summary of Delay Evaluation**

Evaluation Criteria	Status Quo	Improved Technology	Maximized Airport Development	New Airport Development
Delay	■	■	□	□

- Limited Impact
- ▣ Moderate Impact
- Significant Impact

## User Convenience

User convenience can be defined as the ease of access to the Regional airport system. Access from the air is being evaluated as part of the delay analysis; therefore the user convenience evaluation criterion focuses on the ease of access via ground transportation for existing and potential airport users. In the scope of this evaluation, the number of users in proximity to each airport is used to measure user convenience. To assist in measuring the proximity for each airport, a 30-minute drive time is defined as the airport service area. FAA guidelines indicate that, as a general rule, general aviation airports should be located within 30 minutes of their users. This measurement has been reaffirmed by businesses who use general aviation that have indicated through surveys conducted across the U.S. that they are willing to drive only 30 minutes from the time their plane lands at an airport to their business location. In a major metropolitan area such as Phoenix, while drive time analyses may indicate an ability to drive across town in 30 minutes, congestion does occur, further impacting the convenience of aviation users. The development of a reliever airport system such as the one that exists in Phoenix provides more convenience with the availability of significant general aviation facilities throughout the Valley.

Commercial service airports have much larger service areas which typically range from 60 minutes to 120 minutes depending on the type of service provided at the airport and the availability of service at other airports. Airports with low-cost airline service such as Phoenix-Sky Harbor International with Southwest and America West service have the ability to draw demand from a wide range, including most of southern Arizona.

The drive times for the RASP have been developed based on the capacity and configuration of the existing road network, using speed limits to determine the area that can typically be driven in 30 minutes in all directions from the airport. Traffic congestion is addressed in the access improvements criterion.

Three groups of users in Maricopa County have been identified and measured in respect to their proximity to the 30-minute airport service areas. Data from the FAA's database of registered pilots was matched to zip codes in the County revealing that the airport coverage areas for the existing Regional system accommodate over 10,100 out of the nearly 10,500 registered pilots in Maricopa County.

In addition to pilots, the locations of businesses throughout Maricopa County with the propensity to use general aviation services were considered. These businesses were identified using North American Industry Classification System (NAICS) codes. The types of NAICS codes included in the evaluation are those that have been identified in nationwide business surveys to have the propensity to use aviation, such as those in the manufacturing, transportation, telecommunications, engineering/consulting, information industry, and utility sectors. The analysis determined that the airport coverage areas for the existing Regional system accommodate approximately 15,600 businesses and 509,200 employees – nearly all of the businesses with the propensity to use aviation in Maricopa County.

Finally, convenience to the population of Maricopa County has also been evaluated. Both existing and projected population estimates have been considered to evaluate how the alternative airport systems serve the Region's residents. The analysis determined that the airport coverage areas for the existing Regional system accommodated approximately 3,092,000 people out of 3,098,000 in Maricopa County, based on U.S. Census data for 2000.

Through analysis of the convenience related to pilots, businesses, and population, each alternative scenario was evaluated to determine the impact of implementation related to user convenience.

#### Status Quo Alternative

The evaluation of user convenience under the Status Quo alternative considers the proximity of users to the 30-minute drive time airport coverage areas for the existing Regional airport system. **Table 5.16** summarizes the amount of users in proximity to airports in the Regional system.

**Table 5.16**  
**Summary of User Convenience Impacts**  
**Status Quo Alternative**

Airport Name	Registered	Businesses Using Aviation	
	Pilots	Businesses	Employees
Buckeye Municipal	900	400	19,000
Chandler Municipal	5,200	8,400	300,000
Estrella Sailport	1,400	300	12,000
Gila Bend Municipal	10	5	30
Glendale Municipal	4,700	9,000	319,000
Memorial	4,700	8,100	288,000
Mesa Falcon Field	5,800	8,100	280,000
Phoenix-Deer Valley	6,800	12,200	390,000
Phoenix-Goodyear	4,900	8,700	307,000
Phoenix-Sky Harbor International	9,900	15,400	501,000
Pleasant Valley	3,900	3,800	114,000
Scottsdale	6,600	12,100	377,000
Sky Ranch Carefree	3,600	2,200	57,000
Stellar Airpark	5,700	11,000	377,000
Wickenburg Municipal	250	40	1,400
Williams Gateway	3,700	3,600	123,000

Source: Wilbur Smith Associates

**Exhibit 5.5** depicts the locations of registered pilots, **Exhibit 5.6** depicts businesses with the propensity to use aviation, and **Exhibit 5.7** depicts the locations and density of existing and projected population in relation to the airport coverage areas.

As illustrated in Exhibits 5.5, 5.6, and 5.7, and summarized in Table 5.16, a majority of local aviation users are located in the greater metropolitan areas of Phoenix and Tempe, residing within Loop 101 to the north and the new Santan Freeway to the south. The airports that are located in this area, and likely serve the needs of these users most frequently are Sky Harbor, Scottsdale, and Phoenix – Deer Valley. These three facilities combine to accommodate nearly 40,000 businesses with the propensity to use general aviation, over 23,000 registered pilots, and a metropolitan area with almost 3.3 people in 2002, as recorded by the Arizona Department of Economic Security. Other system airports serving the greater metropolitan area include Chandler, Glendale, Mesa Falcon, Phoenix-Goodyear and Stellar.

Under the Status Quo alternative, and in terms of user convenience to existing airports, the current Regional aviation system serves the users exceptionally well. Greater than 96 percent of registered pilots, almost 100 percent of businesses with the propensity to use aviation, and a nearly all residents are within a 30-minute drive of a general aviation or commercial service airport facility. In many cases, these users are within 30-minutes of several airports, providing multiple choices and opportunities to utilize general aviation services.

#### Improved Technology Alternative

Under the Improved Technology alternative, it is anticipated that user convenience would be relatively similar to the Status Quo alternative. Although airport and airspace capacity would be improved due to the implementation of proposed technological and procedural changes over the next 10 years throughout the system, these changes will have minimal impacts on user convenience as measured by ground access at system airports within their respective 30-minute drive time airport coverage area. Therefore, it is assumed that the impacts that would result from the Improved Technology alternative would be the same as those for the Status Quo alternative.

#### Maximized Airport Development Alternative

Under the Maximized Airport Development alternative, it is anticipated user convenience would be relatively similar to of the Status Quo alternative (see Exhibits 5.5, 5.6, and 5.7 for the locations of registered pilots, businesses with the propensity to use aviation, and the locations and density of existing and projected population in relation to the airport coverage areas). Although airport capacity would be improved due to the implementation of proposed projects at particular facilities throughout the system, these changes have minimal impacts on user convenience as measured by ground access at system airports within their respective 30-minute drive time airport coverage area. Therefore, it is assumed that the impacts that would result from the Maximized Airport Development alternative would be the same as those for the Status Quo alternative.

#### New Airport Development Alternative

The evaluation of user convenience under the New Airport Development alternative considers the proximity of users to the 30-minute drive time airport coverage areas for the new airport locations. **Table 5.17** summarizes the amount of users in proximity to potential airports considered under the New Airport Development alternative.



**Table 5.17**  
**Summary of User Convenience Impacts**  
**New Airport Development Alternative**

Airport Name	Registered	Businesses Using Aviation	
	Pilots	Businesses	Employees
New Forepaugh GA	30	40	1,400
New Peoria GA	3,900	3,800	114,000
New East Valley GA	2,500	950	31,000
New South Valley GA	4,600	6,000	227,000
New North Commercial	3,300	2,800	87,800
New RAFA Commercial	1,900	300	24,000
Supplemental Williams Commercial	3,700	3,600	123,000

Source: Wilbur Smith Associates

Exhibits 5.5, 5.6 and 5.7 also depict the locations of registered pilots, locations of businesses with the propensity to use aviation, and the locations and density of population in relation to the new airport coverage areas.

As illustrated in Exhibits 5.5, 5.6, and 5.7 and summarized in Table 5.17, the 30-minute drive times for the new airports proposed under the New Airport Development alternative do not extend significantly into areas not served by the airports in the existing Regional system. Of the seven proposed new airports, only the New Forepaugh GA, New South Valley GA, and New East Valley GA have 30-minute drive time coverage that extend into areas outside of the existing service area provided by the existing Regional system of airports. Therefore, the users summarized in Table 5.17 likely include many of the same users that were accounted for under the Status Quo Alternative, shown in Table 5.16. New airports would provide access for future users of the aviation system as the metropolitan area continues to spread in all directions. New airports, especially commercial service airports, would however potentially increase the driving time for users who chose to utilize these airports as opposed to using the existing Phoenix-Sky Harbor International Airport.

#### Summary of User Convenience Evaluation

Due to the extent to which users are served under the Status Quo alternative, it is evident that the implementation of the New Airport Development alternative would have a minimal positive impact on existing user convenience. While new airports would increase the opportunity for user convenience, it is difficult to determine to what degree a measurable improvement in user convenience would be realized in the Regional system. This is true regardless of which new airport or set of new airports are selected for development. A new commercial service airport would be located further away from the centers of existing demand served by Phoenix-Sky Harbor International Airport, but could serve new areas of demand generated as the metropolitan area continues to spread from the central urban area.

As stated previously, in terms of ground access to existing airports, the current Regional aviation system serves the users very well. Over 96 percent of registered pilots and almost 100 percent of businesses with the propensity to use aviation are within a 30-minute drive of a general aviation or commercial service airport facility. The same is true for existing and future County residents. In fact, in many cases these users are within 30-minutes drive of several airports, providing multiple choices and opportunities to utilize aviation facilities in Maricopa County. Therefore, in terms of user convenience, the New Airport Alternative will have a minimal impact on the convenience to the Regional system of airports currently enjoyed by aviation users in the greater Phoenix metropolitan area.

**Table 5.18** indicates the impact of the alternatives on user convenience.

**Table 5.18**  
**Summary of User Convenience Evaluation**

	Status	Improved	Maximized	New
Evaluation Criteria	Quo	Technology	Airport	Airport
	Development	Development	Development	Development
User Convenience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- ☐ Limited Impact  
☒ Moderate Impact  
☐ Significant Impact

### Access Improvements

Beyond the consideration of user convenience as a measure of the distance between the users and the facilities is the access of users to aviation facilities via ground transportation. While the majority of primary users in Maricopa County are within a 30-minute drive of an airport, there are unique access issues that affect user convenience. The evaluation of accessibility improvements that may improve user convenience under the alternatives considers the proximity of significant roadway improvements projects to existing airport locations.

#### Status Quo Alternative

Based on a review of the *MAG Long Range Transportation Plan 2002 Update*, there are several significant roadway improvement projects that will improve user convenience under the Status Quo alternative. The following descriptions characterize the proximity and significance of planned roadway projects that may improve user access, by airport. While there is an extensive list of projects that are planned for construction within Maricopa County, only those projects believed to contribute to improved user access at existing airports are discussed.

- ☐ **Buckeye Municipal**  
The most significant roadway improvement project in proximity to Buckeye is the widening of State Route (SR) 85 between Gila Bend and Interstate 10 from two to four lanes.
- ☐ **Chandler Municipal**  
The most significant roadway improvement project in proximity to Chandler is the Santan Freeway (Loop 202), which will extend 24 miles from I-10 to the Superstition Freeway.
- ☐ **Glendale Municipal**  
The most significant roadway improvement project in proximity to Glendale is the improvement of Glendale Avenue.
- ☐ **Memorial**  
The most significant roadway improvement project in proximity to Memorial is widening of I-10 between Chandler Boulevard and Riggs Road to six lanes. There are also improvements scheduled for portions of Arizona Avenue and Queen Creek Road.
- ☐ **Mesa Falcon Field**  
The most significant roadway improvement project in proximity to Mesa is the completion of Red Mountain Freeway (Loop 202). There are also improvements scheduled for portions of Power Road, McDowell Road, Higley Road, and Bush Highway.
- ☐ **Phoenix – Deer Valley**  
The most significant roadway improvement projects in proximity to Deer Valley are those improvements scheduled for portions of Deer Valley Road, 19<sup>th</sup> Avenue and 7<sup>th</sup> Street.

❑ **Phoenix – Goodyear**

The most significant roadway improvement projects in proximity to Goodyear are those improvements scheduled for Baseline Road, Litchfield Road, Broadway Road, and Lower Buckeye Road.

❑ **Scottsdale**

The most significant roadway improvement project in proximity to Scottsdale is the final segment of Pima Freeway (Loop 101) between Scottsdale Road and Princess Drive/Pima Road. There are also significant improvements scheduled for portions of Scottsdale Road, on both the north and south sides of Pima Freeway.

❑ **Williams Gateway**

Continued expansion of the Santan Freeway (Loop 202) to the east will help improve access to Williams Gateway. The sections anticipated to have the most impact connect I-10 to the Price Freeway (Loop 101) and the Superstition (Route 60). It is anticipated that these improvements will be completed in late 2006.

In addition to roadway projects, there are other access improvements planned in the MAG Region that have the potential to impact airports. After significant study of transportation issues, the Central Phoenix/East Valley Light Rail Transit Project is in the planning, design, and environmental analysis stage (see **Exhibit 5.8**). Construction is expected to begin in Spring 2004 according to Valley Metro, with operation in late 2006 of the first phase from downtown Phoenix to downtown Tempe. The 20.3-mile starter segment of the line is planned to run from the Chris-Town area to downtown Phoenix, through downtown Tempe, and into Mesa, with Phoenix-Sky Harbor International Airport a mid-point of the route. There are several additional corridors that have been identified for future extension of the light rail. The first planned extension is to Metrocenter Mall in western Phoenix. Tempe is considering a Rio Salado spur from downtown Tempe. The City of Glendale 2001 transportation referendum included a light rail extension from Phoenix to downtown Glendale. Scottsdale Road has been approved as a high-capacity transit corridor, which could be used for light rail or other high capacity modes in Scottsdale and Tempe.

The current planning for light rail only serves Phoenix-Sky Harbor International Airport, as the focus is in the central area of the Region where there are no other aviation facilities. It appears that the rail could be extended to the east toward Williams Gateway Airport, possibly providing access between Williams Gateway and Phoenix-Sky Harbor International. This extension was recommended as part of the Williams Area Transportation Plan, completed in 1997. Development of the Scottsdale Road high-capacity transit corridor would benefit Scottsdale Airport which is accessed from this road.

*Improved Technology Alternative*

Under the Improved Technology alternative, access improvements and their impacts on user convenience are assumed to be the same as under the Status Quo alternative.

*Maximized Airport Development Alternative*

Under the Maximized Development alternative, access improvements and their impacts on user convenience are assumed to be the same as under the Status Quo alternative.

*New Airport Development Alternative*

Based on a review of the MAG Long Range Transportation Plan 2002 Update, there are no significant roadway projects that are currently planned to improve user convenience under the New Airport Development alternative. Any roadway improvement projects that may be necessary at these new sites would likely be addressed as part of a detailed process to attend to the specific issues at each site.

- ❑ **New Forepaugh GA**  
Because Forepaugh is an existing airport, significant access improvements would not be needed.
- ❑ **New Peoria GA**  
Access to the New Peoria GA airport would need to be enhanced from the existing access provided to Pleasant Valley. There are currently major streets providing access from Interstate 17 that would need to be enhanced to provide additional capacity for the activity anticipated at a new general aviation airport in this location.
- ❑ **New East Valley GA**  
Access to the New East Valley GA site would be provided by Arizona Highway 87, the Bee Line Highway. The only access improvements needed would be a road from the Bee Line Highway into the airport, assuming its development in this general vicinity.
- ❑ **New South Valley GA**  
The New South Valley site is proposed south of the Maricopa County line, along the Interstate 10 corridor. Access to this site would be excellent with a need for an exit and access road from the Interstate, depending upon the final site location. The most significant issue with this site's access is that it lies beyond Maricopa County's boundaries and would require coordination with Pinal County transportation officials for the airport and access issues.
- ❑ **New North Commercial**  
Access to the New North Commercial site would require significant access improvements. The selected site is west of Interstate 17 and would require a limited access highway from the Interstate to the facility to adequately accommodate commercial activity.
- ❑ **New RAFA Commercial**  
The New RAFA Commercial site is located south of Maricopa County near Casa Grande in Pinal County. The site is located near Interstate 10 and not far from its intersection with Interstate 8. This site would provide excellent access, but is significantly removed from the population centers either in Phoenix or Tucson. This site would likely require expansion of Interstate 10 from the Maricopa County border down to the site, and beyond if it was projected to serve demand from Tucson as well. In addition to supplementing the capacity of Interstate 10 to serve the site, exits and access roads from the Interstate would be needed for the commercial service airport facility.
- ❑ **Supplemental Williams Commercial**  
Williams Gateway is an existing airport with excellent access. Continued expansion of the Santan Freeway (Loop 202) to the east will help improve access to Williams Gateway. The sections anticipated to have the most impact connect I-10 to the Price Freeway (Loop 101) and the Superstition (Route 60). It is anticipated that these improvements will be completed in late 2006, indicating a limited need for additional improvements to serve commercial service airport needs.

#### Summary of Access Improvements

As discussed above, the unique access issues that affect user convenience at existing airports may be improved by projects contained in the MAG Long Range Transportation Plan 2002 Update. Additionally, many of the projects described above are programmed for completion by 2007 in the Fiscal Year 2003-2007 MAG Transportation Improvement Program. While it is difficult to measure the precise impacts that these improvement projects will have on access at each airport, it is reasonable to anticipate some degree of improved access as a result of these projects.

No additional access improvements were identified as necessary to accommodate the Status Quo, Improved Technology, or Maximized Airport Development alternatives. Development of new airports in the New Airport Development alternative will have the most significant access requirements, as additional improvements beyond those already planned will be required to support the new airport sites. The Supplemental Williams Commercial site, included in the New Airport Development alternative, would have the least impact in the New Airport Development alternative since significant improvements

are already programmed that would provide the airport with adequate access to serve as a commercial airport.

**Table 5.19** indicates the impact of access improvements on the alternatives.

**Table 5.19**  
**Summary of Access Improvements Evaluation**

Evaluation Criteria	Status Quo	Improved Technology	Maximized Airport Development	New Airport Development
Access Improvements	□	□	□	■

- Limited Impact  
 ■ Moderate Impact  
 ■ Significant Impact

### Airspace Compatibility

Airspace within the MAG Region represents a finite commodity (see **Exhibit 5.9** that depicts the Region's airspace and **Exhibit 5.10** that depicts traffic pattern airspace for the Region's airports). Phoenix-Sky Harbor International Airport and Luke Air Force Base (AFB) represent significant economic generators within the Phoenix Metropolitan area, and as such occupy the highest level of concern relative to airspace issues. The airspace requirements of operations into and out of Phoenix-Sky Harbor International and Luke represent a framework within which all other existing and future airports must operate. Previous working papers have established the existing approach and departure procedures into and out of these two airports and the Special Use Airspace (SUA) required to accommodate the mission of Luke. Although these airspace procedures may change in the future, the current size of the airspace reservation areas for these two airports are considered the baseline within which the aviation system (existing and future) is evaluated.

This evaluation considers proposed improvements for each of the alternatives and their impact on the current and projected airspace requirements of Phoenix-Sky Harbor International and Luke. Priority is given to safe-guarding the existing and future airspace requirements of these two facilities. Where runway improvements or new instrument approach procedures are proposed at system airports, the impacts of those proposals on existing and future operations at Phoenix-Sky Harbor International, Luke, and other airports are evaluated to identify potential negative impacts. For the Status Quo, Improved Technology, and Maximized Airport Development alternatives, the degree of impact of proposed new procedures on Regional airport operations, or lack thereof, establishes the basis for the evaluation. For the New Airport Development alternative, the airspace analysis examines the impact on airspace use associated with any new facilities as identified in the alternative.

Scoring for each proposed improvement in each alternative is in a matrix format with three levels of impact:

- **Severe:** This level of impact indicates an incompatibility and significant adverse impact to either Luke AFB or Phoenix-Sky Harbor International airspace. Factors considered included the degree of airspace overlap for instrument approaches along with the level of activity likely at each affected airport.
- **Moderate:** This level of impact, while significant, is not as adverse to either Luke or Phoenix-Sky Harbor International as the Severe category.

- ❑ **Neutral:** This level of impact is site-specific and indicates that the proposed development would have little direct impact on either Luke or Phoenix-Sky Harbor International.

These measures are necessarily broad in nature and reflect the fluid nature of airspace interaction between airports. A discussion of each proposed improvement and its impact is given prior to the matrix scoring.

### ***Impact on Luke AFB Airspace***

Discussions with Luke personnel were held to ascertain their views on the potential impacts of projects included in the four alternatives. The following sections briefly describe the results of the analysis.

#### **Status Quo Alternative**

This alternative incorporates all of the currently programmed projects as described below.

- ❑ **Buckeye Municipal** - extends Runway 17-35 to 5,500'  
Potentially severe impact for conflict with increased VFR traffic transiting Luke's terminal airspace (not talking with Luke RAPCON) and conflicting with the Valley Recovery (Luke's primary recovery route from Barry M. Goldwater Range). This increases the mid-air collision potential. Another concern is how IFR traffic from the east, north, and south is routed/transitioned to de-conflict with Luke traffic. Neutral to moderate impact for aircraft landing from the west. Again dependent on routing of aircraft, this improvement has the potential to interfere with the Nurdy Arson and Nurdy Nolls departures.
- ❑ **Glendale Municipal** - extends Runway 01 to 7,150' (the displaced threshold on Runway 19 limits the usable length to 6,350')  
Moderate impact. A longer runway has potential to increase number of higher performance traffic requiring specialized handling. Traffic in the vicinity of Grand Avenue crossing Luke's extended final approach is a serious concern today. An increase in traffic in this area would increase the mid-air collision potential and something would need to be done to mitigate the increase of traffic; however, the City of Glendale works closely with Luke AFB to mitigate all severe impacts
- ❑ **Wickenburg Municipal** - extends runway 5-23 to 6,100'  
Moderate impact. A longer runway allows higher performance aircraft to land at the airport. The current unknown is how these aircraft will be routed. Aircraft from the west are a major concern because of the proximity of Gladden/Bagdad MOA.

Because only three of the Status Quo's 16 airports show future improvements that would potentially impact airspace, the alternative has an overall neutral impact on the Region's airspace. Of course, this alternative seriously under-serves forecast demand. That negative impact is quantified in a different evaluation criterion concerning aircraft delay. For airspace purposes, however, the impact on Luke of three runway extensions in the overall rating of alternatives can be consider minimal or "neutral."

#### **Improved Technology Alternative**

The Improved Technology alternative includes the installation of new radars such as the ASR-11, improved radar coverage, and improved instrument landing aids such as precision Global Positioning System (GPS), Local Area Augmentation System (LAAS), Wide Area Augmentation System (WAAS), and Automatic Dependent Surveillance - Broadcast (ADS-B) systems. All of these improved technologies are believed to be capable of increasing capacity at system airports, independent of physical improvements. As such, the rating of the alternative had to be given for the entire alternative and not for individual airports.

New technology has the potential to improve controllers' ability to see to the ground at Deer Valley and Scottsdale airports and no longer requiring these airports to be handled as one airport (for ATC conventional control separation purposes). Luke's greatest concern is how this new technology affects the routing of aircraft within Luke's terminal airspace and what impact there will be on Special Use Airspace (SUA) surrounding the Valley (i.e. Sells, Outlaw/Jackal, etc.). The key question is as new technology increases an airport's and the ATC system's capacity, what demands will be placed on SUA during severe weather and high-density traffic periods? The rating for the Improved Technology alternative is neutral to potentially severe for the entire alternative.

### Maximized Airport Development Alternative

The Maximized Airport Development alternative seeks to improve airport capacity at all facilities where that is possible. Both the physical improvement (such as runway extensions or parallel taxiways) and the improvements to instrument navigation were analyzed in this alternative on an airport-by-airport basis.

- ❑ **Buckeye Municipal - Longer Runway, Precision Approach**
  - Moderate impact for the longer runway for the same reasons as stated in the Status Quo Alternative. Higher levels of large aircraft activity are expected with the longer runway.
  - Potentially severe impact for the precision approach. As the demand to fly precision approaches increases, a holding pattern may need to be designed to separate the aircraft. The location of a precision approach at Buckeye could possibly conflict with Luke's Nordy Nolls and Nordy Arson departures, the Valley Recovery (primary arrival), and may impact one of Luke's low-level air routes north of Buckeye. Luke's operating ceiling is limited by Phoenix-Sky Harbor International traffic thus losing the flexibility to adjust their arrivals and departures.
- ❑ **Chandler Municipal - Longer Runway, Precision Approach**
  - Neutral impact for the longer runway. Just how the traffic patterns would be adjusted for Chandler is unknown.
  - Moderate to potentially severe impact for the precision approach. A precision approach from the northeast may cause adjustments to other east valley airports thus having a negative impact on Outlaw/Jackal MOA. A precision approach from the southwest (depending on how aircraft are routed) has the potential to affect Sells SUA and several low-level routes. While Military Training Routes (MTRs) are Visual Flight Rules (VFR) flight, the potential exists to decrease flight safety.
- ❑ **Glendale Municipal - Taxiway Extension, Precision Approach**
  - Moderate to potentially severe impact for the precision approach. A precision approach for traffic landing (full-stop) would have a moderate impact on Luke aircraft. High performance aircraft such as corporate business jets may be more compatible with Luke aircraft than some types of general aviation aircraft. A potentially severe impact may be encountered if aircraft were allowed to shoot practice approaches during the week because of the proximity to Deer Valley, Goodyear, Phoenix-Sky Harbor International, and Luke AFB (Luke is approximately 3.1 nautical miles from Glendale). The traffic pattern (routing) of this approach could have a potentially severe impact on surrounding airports as well as Luke.
- ❑ **Memorial - Reopening, Non-precision Approach**
  - Neutral impact on re-opening the airport on Luke.
  - Neutral to moderate impact for the non-precision approach. As the airport is currently operated on a limited basis, Luke personnel are not sure what types/density of traffic may be generated with its reopening. The potential exists to impact several low-level routes and the Sells MOA.
- ❑ **Mesa Falcon Field - Precision Approach**
  - Neutral impact if the precision approach was from the southwest (unless other airport instrument traffic patterns/routings were adjusted that would impact Outlaw/Jackal MOA).
  - A moderate impact may occur if the approach was from the northeast. It is unknown if the routing would put a strain on the Outlaw/Jackal MOA.

- ❑ **Phoenix - Deer Valley - Parallel Runway, Precision Approach**
  - Neutral to moderate impact for the parallel runway. Another runway may increase the density of traffic in the vicinity of Luke's extended final to Runway 21 and out by Lake Pleasant where many of the low-level training routes begin, thereby degrading flight safety.
  - Neutral impact for the precision approach if it is from the east and missed approach remains in Phoenix TRACON airspace.
  - Severe impact if the precision approach is from the west. Traffic would cross Luke's extended centerline to runway 21. With the numerous training flights that are generated out of Deer Valley Airport it is expected that there would be a great demand for practice precision approaches which may increase the mid-air collision potential. Practice approaches during 56<sup>th</sup> Fighter Wing flying would severely impact Luke's operation.
- ❑ **Phoenix - Goodyear - Parallel Runway, Precision Approach**
  - Moderate to severe impact for the parallel runway. The only direction a parallel runway appears feasible is to the west. This places Goodyear traffic closer to the extended runway centerline for Luke's runway 3R-21L (arrival/ departure).
  - Potentially severe impact for any precision approach, especially if it were to be used for practice approaches (such as Lufthansa flight training). Luke would be in the same position as the other airports in terms of possibly having to deny practice approaches during the week and when they fly on weekends. The minimum vectoring altitude for this area used by controllers in the RAPCON is currently 3,000' MSL. Due to traffic landing at Phoenix-Sky Harbor International, the highest altitude for use in this area is 5,000' MSL. This compressed airspace leaves no room for a holding pattern and there is very limited airspace to vector aircraft.
- ❑ **Phoenix - Sky Harbor International - Fourth Runway, Precision Approach**
  - Moderate to potentially severe for the fourth runway. A new runway and additional terminal space in itself is not the problem; rather, how much more operational traffic this allows at Phoenix-Sky Harbor International. Currently, on bad weather days the traffic into/out of Phoenix-Sky Harbor International and routing of this traffic causes the FAA to cap SUA, i.e. Outlaw/Jackal, Gladden/Bagdad MOA's surrounding the Valley. Any large increase in traffic may further this impact.
  - Neutral to severe impact for a precision approach from the east. In this regard, the rating is neutral to moderate for the approach and severe for the potential strain on SUA. The additional runway (north runway) would require a precision approach. Luke is not sure how this approach would impact Luke's terminal airspace.
- ❑ **Pleasant Valley - Pave Runway System & Parallel Taxiway, Non-precision Approach**
  - Moderate to potentially severe impact for paving the runway. The location of Pleasant Valley relative to Luke (14 nautical miles extended final to Runway 21L/3R) makes any expansion a major concern.
  - Neutral to moderate impact for the parallel taxiway. The impact would increase if the parallel taxiway were to be used as a landing surface.
  - Moderate to severe impact for adding a non-precision approach. The direction of the non-precision approach, whether or not it would be used for practice approaches, and how these improvements would increase the density of traffic are all issues that would influence the impact on Luke.
- ❑ **Scottsdale - Parallel Taxiway, Precision Approach**
  - Neutral impact on the addition of a parallel taxiway.
  - Neutral to moderate impact for the precision approach. Unknowns are the direction for the approach, the routings to be used, and whether or not traffic would be routed as to impact SUA. Impact would increase if SUA or Luke's terminal airspace were impacted.
- ❑ **Wickenburg Municipal - Non-precision Approach**
  - Moderate to potentially severe impact for a non-precision approach (depending on type). Primary impacts could occur on Gladden/Bagdad MOA and on the traffic pattern for the Luke Auxiliary-1 (AUX-1) airfield.



- ❑ **Williams Gateway – Additional Runway, Longer Runway, Precision Approach**
  - Neutral impact for the longer runway.
  - Neutral to potentially severe impact for the additional runway. This runway (if east-west orientation) would put traffic in a flow similar to Phoenix-Sky Harbor International, impacting SUA during bad weather conditions.
  - Neutral to potentially severe impact depending on the direction of the precision approach, and what routing aircraft would take to get to/from Williams. Luke's concern centers on how this new precision approach would affect SUA and routings to/from the Valley. Also, bad weather may increase the possibility of capping SUA or moving other traffic patterns.

The overall impact of the Maximized Airport Development alternative on Luke's airspace is moderate to severe, depending upon a range of factors such as the degree to which SUA is impacted, the density of air traffic operating at facilities near Luke, and the complexity of airspace related to some proposed precision instrument approaches at airports in the Valley. Many of the proposed improvements permit greater levels of air traffic activity, leading to potential impacts on Luke's airspace. Increasing airspace complexity can have an adverse effect upon Luke's mission. In particular, airports near Luke that have proposed precision approaches (Buckeye, Glendale, Deer Valley, Phoenix-Sky Harbor International, Goodyear) have the potential to severely impact Luke's operational capability.

#### *New Airport Development Alternative*

The New Airport Development alternative features one new general aviation airport with four potential sites and one new commercial service airport with three potential sites. The possible locations for both general aviation and commercial service airports have been analyzed as they potentially impact Luke's airspace. Descriptions of these impacts are given below.

- ❑ **New Forepaugh GA**  
Moderate to severe impact, depending upon the degree of development at this new airport location. Forepaugh lies on the eastern boundary of Gladden/Bagdad MOA. Aircraft transitioning from the west would have to go around the MOA, as transiting through the MOA will severely impact Luke's ability to use the Gladden/Bagdad MOAs to meet the mission.
- ❑ **New Peoria GA**  
Severe impact for this new airport for the same reasons as Maximized Airport Development alternative developments at Pleasant Valley.
- ❑ **New East Valley GA**  
Neutral to potentially severe impact based on the location of the airport and its potential interference with low-level routes and SUA. The unknowns about this location make it difficult to assess from Luke's point of view. Two Military Training Routes (MTRs), VR 244 and 241, appear to cross north of the potential site and may be impacted by increased general aviation activity. Assuming the new facility is located just west of State Route 87, the impact would be neutral to moderate for Luke's mission.
- ❑ **New South Valley GA**  
Neutral to severe impact depending on its location. There are low-level routes flown by Davis-Monthan AFB and Luke in this vicinity. Outlaw MOA and R-2310 are both located in this area. Factors affecting the degree of impact include such items as the density of traffic and the size of an airport that would be constructed. Given a location on the west side of Interstate Highway 10, the impact should be neutral to Luke's mission.
- ❑ **New North Commercial**  
Potentially severe impact, depending upon the ultimate site location. Impacts would extend to traffic patterns, other airports besides Luke, Gladden/Bagdad MOA, low-level routes, and general aviation VFR training area. This is a major VFR training area, raising the question of where these aircraft

would go. Instrument traffic patterns would most likely be routed south of the airport that would conflict with Luke's terminal airspace to include AUX-1.

❑ **New RAFA Commercial**

Moderate to potentially severe impact. This area would be of concern dependent on the routing of aircraft, potential traffic patterns, density of traffic on the impact to Sells MOA (vital training area for the Arizona ANG Guard, Davis-Monthan AFB, and Luke AFB), numerous low-level routes, etc.

❑ **Supplemental Williams Commercial**

Moderate to severe impact. Key questions that are unknown at this time include what would be the routing of aircraft, what are the operational numbers, and what would be the impact on SUA. The impact associated with the Maximized Airport Development alternative is also applicable. Restricted airspace R-2310 and Outlaw MOA to the south create problems for arrivals and departures to the southeast. Mesa-Falcon Field and Phoenix-Sky Harbor International approach/departure paths are located to the northwest. Significant increases in commercial traffic at Williams Gateway could potentially create moderate to severe impacts to Luke's mission.

From Luke's airspace impact evaluation, it can be concluded that the worst combination of commercial service and general aviation airports would be the development of the new North Commercial airport in conjunction with the new Peoria general aviation airport. This impact would be considered severe. All other combinations of new commercial service and general aviation airports would have roughly the same moderate impact.

### ***Impact on Regional Airspace***

The second portion of the analysis concerns the potential impacts of all the alternative improvements on the Region's airports, and specifically on Phoenix-Sky Harbor International Airport's airspace. Discussions with FAA personnel were held to ascertain their views on the potential impacts of projects included in the four alternatives. The following sections briefly describe the results of the analysis.

#### **Status Quo Alternative**

This alternative incorporates all of the currently programmed projects as described below.

❑ **Buckeye Municipal** - extends Runway 17-35 to 5,500'

Neutral impact for Phoenix-Sky Harbor International. All impacts would be on Luke.

❑ **Glendale Municipal** - extends Runway 01 to 7,150' (the displaced threshold on Runway 19 limits the usable length to 6,350')

Neutral impact for Phoenix-Sky Harbor International. Moderate impact to Luke.

❑ **Wickenburg Municipal** - extends runway 5-23 to 6,100'

Neutral impact for Phoenix-Sky Harbor International. All impacts would be on Luke.

In summary, the impacts for the Status Quo Alternative of these physical improvements at system airports on the Regional airspace would be neutral. The proximity of these airports to Luke thus results in potential airspace impacts at Luke rather than Phoenix-Sky Harbor International.

#### **Improved Technology Alternative**

As described above, improved technology would have a system-wide impact and as such, the rating of the alternative was given for the entire alternative and not for individual airports.

New technology (including additional radar site(s) in the North Valley area) has the potential to improve controllers' ability to see to the ground at Deer Valley and Scottsdale airports and no longer requiring these airports to be handled as one airport (for ATC conventional control separation purposes). Increased airspace capacity may result at all instrument-capable airports in the Region, which would benefit the entire Region. The airspace impact on the Region and on Phoenix-Sky Harbor International for this entire alternative is neutral.

#### Maximized Airport Development Alternative

As mentioned previously, this alternative seeks to improve airport capacity at all facilities where that is possible. Both the physical improvement (such as runway extensions or parallel taxiways) and the improvements to instrument navigation were analyzed in this alternative on an airport-by-airport basis.

- ❑ **Buckeye Municipal** - Longer Runway, Precision Approach
  - Neutral impact on Phoenix-Sky Harbor International airspace for the runway extension.
  - Neutral impact on Phoenix-Sky Harbor International airspace for the precision approach.
- ❑ **Chandler Municipal** - Longer Runway, Precision Approach
  - Neutral impact on Phoenix-Sky Harbor International for the longer runway. Larger aircraft may impact Williams Gateway Airport operations and a re-opened Memorial Airport.
  - Severe impact on Phoenix-Sky Harbor International for a precision instrument approach from the northeast (Runway 22). This approach would impact the Class B airspace for Phoenix-Sky Harbor International where the floor is 4,000' MSL and the ceiling is 10,000' MSL. Aircraft would intersect Phoenix-Sky Harbor International arrival/departure paths, as well as those from Williams-Gateway.
  - Neutral impact on Phoenix-Sky Harbor International for a precision instrument procedure from the southwest (Runway 4).
- ❑ **Glendale Municipal** - Taxiway Extension, Precision Approach
  - Severe impact on Phoenix-Sky Harbor International for the precision approach. A severe impact may be encountered unless Luke could contain all of the approach airspace blocks, relieving Phoenix-Sky Harbor International of that responsibility.
- ❑ **Memorial** - Reopening, Non-precision Approach
  - Neutral impact on Phoenix-Sky Harbor International for re-opening the airport.
  - Neutral impact on Phoenix-Sky Harbor International for the non-precision approach.
  - Other nearby airports such as Chandler and Stellar would have greater potential impact due to the possible increase in instrument training that may occur. In particular, arrivals to runway 4L or 4R and departures in the Runway 22 direction would potentially impact activity at Memorial and vice versa. Operations to the south of Stellar would have similar interaction with Memorial.
- ❑ **Mesa Falcon Field** - Precision Approach
  - Severe impact on Phoenix-Sky Harbor International for a precision approach on either runway end. From the southwest, the precision approach would interact with Phoenix-Sky Harbor International Class B airspace (altitudes from 3,000' to 10,000'). This approach would severely impact arrivals and departures from Phoenix-Sky Harbor International. From the northeast, the terrain rises rapidly, making a precision approach very difficult to implement. An approach from this direction is not likely. However, even if an approach from the northeast is possible, it would create a severe impact on Phoenix-Sky Harbor International due to traffic flows through the area.
- ❑ **Phoenix - Deer Valley** - Parallel Runway, Precision Approach
  - Neutral impact on Phoenix-Sky Harbor International for the parallel runway.
  - Neutral impact on Phoenix-Sky Harbor International for the precision approach from the west. It may not be workable to put a precision approach from the east due to obstructions several miles off the runway end (rising terrain).
- ❑ **Phoenix - Goodyear** - Parallel Runway, Precision Approach
  - Neutral impact on Phoenix-Sky Harbor International for the parallel runway.

- Severe impact on Phoenix-Sky Harbor International for precision approach on Runway 21. Traffic would impact both Luke and Phoenix-Sky Harbor International, crossing Phoenix-Sky Harbor International arrival and departure routes.
- Neutral impact on Phoenix-Sky Harbor International for precision approach on Runway 3.
- ❑ **Phoenix - Sky Harbor International - 4<sup>th</sup> Runway, Precision Approach**
  - Airport under discussion.
- ❑ **Pleasant Valley - Pave Runway System & Parallel Taxiway, Non-precision Approach**
  - Neutral impact on Phoenix-Sky Harbor International for all improvements. Airport is too far removed from Phoenix-Sky Harbor International airspace to impact operations.
- ❑ **Scottsdale - Parallel Taxiway, Precision Approach**
  - Neutral impact on the addition of a parallel taxiway.
  - Moderate impact for the precision approach. Terrain issues to the north could make it difficult to lower minimums from current levels (not sure that 3.0 degree glide slope is possible). Phoenix-Sky Harbor International would be impacted as traffic spreads the arrivals out through the air traffic management operation for the approach from the south. There is a minimum 12 mile extended centerline for one aircraft using the precision approach. That increases for more aircraft. Business jets would require significant airspace if holding to use the precision approach. Density of traffic around Phoenix-Sky Harbor International would create moderate impact. Mountains between PHX and Scottsdale limit some of this interaction.
- ❑ **Wickenburg Municipal - Non-precision Approach**
  - Neutral impact on Phoenix-Sky Harbor International for non-precision approach.
- ❑ **Williams Gateway – Additional Runway, Longer Runway, Precision Approach**
  - Neutral impact for longer runway.
  - Neutral to moderate impact for the additional runway if it is oriented east-west. Traffic would be in similar flow to Phoenix-Sky Harbor International.
  - Moderate impact to Memorial, Chandler, and Stellar if new east-west runway with a precision approach is developed.
  - Severe impact depending on the direction of the precision approach, and what routing aircraft would take to get to/from Williams Gateway. Severe impact to Phoenix-Sky Harbor International if precision approach is to Runway 12. In addition, a precision approach in the Runway 12 direction would cause potential conflict for Mesa-Falcon Field Class D airspace.
  - Neutral impact to Phoenix-Sky Harbor International if the approach is to Runway 30.

#### *New Airport Development Alternative*

The New Airport Development alternative features one new general aviation airport with four potential sites and one new commercial service airport with three potential sites. The possible locations for both general aviation and commercial service airports have been analyzed as they potentially impact the Region and specifically Phoenix-Sky Harbor International's airspace. Descriptions of these impacts are given below.

- ❑ **New Forepaugh GA**  
Neutral impact on Phoenix-Sky Harbor International airspace. Airport is too far removed from Phoenix-Sky Harbor International airspace to impact operations or capacity.
- ❑ **New Peoria GA**  
Neutral impact on Phoenix-Sky Harbor International airspace. Airport is too far removed from Phoenix-Sky Harbor International airspace to impact operations or capacity.
- ❑ **New East Valley GA**  
Neutral impact on Phoenix-Sky Harbor International airspace.
- ❑ **New South Valley GA**  
Neutral impact on Phoenix-Sky Harbor International airspace.

❑ **New North Commercial**

Severe impact on Phoenix-Sky Harbor International airspace. The let down and climb out would add to the complexity of airspace and must occur through the east-west flow of Phoenix-Sky Harbor International commercial traffic. Traffic would have to be joined with Phoenix-Sky Harbor International traffic at some point to avoid SUAs and transition to destinations east or west. Coordinating this traffic with Phoenix-Sky Harbor International traffic would create a severe impact.

❑ **New RAFA**

Severe impact on Phoenix-Sky Harbor International airspace. Similar to the New North site, the let down and climb out would add to the complexity of airspace and must occur through the east-west flow of Phoenix-Sky Harbor International commercial traffic. Traffic would have to be joined with Phoenix-Sky Harbor International traffic at some point to avoid SUAs and transition to destinations east or west. Coordinating this traffic with Phoenix-Sky Harbor International traffic would create a severe impact.

❑ **Supplemental Williams Commercial**

➤ Moderate impact on Phoenix-Sky Harbor International airspace for Runway 30 departures. These would interact with Phoenix-Sky Harbor International arrival and departure paths. Turns would have to occur early out of the airport to avoid Phoenix-Sky Harbor International traffic. New airspace structure is needed to make this work.

➤ Severe impact on Phoenix-Sky Harbor International airspace for Runway 12 arrivals. The airport would require precision approaches in both directions. In addition, Class D airspace for Mesa-Falcon Field would be impacted. As described earlier, this would be a severe impact to Phoenix-Sky Harbor International airspace.

Overall, it can be stated that the development of a general aviation airport at any of the potential locations shown in the New Airport Development alternative would have a neutral impact on Phoenix-Sky Harbor International airspace. However, the development of a second commercial service airport at the locations described in the New Airport Development alternative would have a potentially severe impact on Phoenix-Sky Harbor International airspace.

*Summary and Ranking of Airspace Utilization Factors*

With two factors analyzed to evaluate the impact of the alternatives on airspace compatibility, a more detailed matrix system was developed. The cumulative impact of each alternative was scored in a matrix format and then averages were developed as a means of comparing airspace impact with other alternative evaluation criteria. **Table 5.20** shows the individual scores for each airport project, based upon the discussion and analysis above. For the scoring system the following numerical assignments were made for each level of impact:

- ❑ Neutral: 0 points
- ❑ Moderate: -1 points
- ❑ Severe: -2 points

In order to develop an overall description of the impact for each alternative, the cumulative total of these scores were compared. In the scoring process, it should be noted that the lowest impact was assumed for any development item where two options were available. For example, if a precision approach causes a neutral impact on one runway end and a severe impact on the other, the neutral impact was used for the scoring process.

**Table 5.20**  
**Evaluation of Airspace Impacts by Alternative**

Airport/Project	Status Quo		Improved Tech.		Max. Devel.		New Airports	
	Luke	PHX	Luke	PHX	Luke	PHX	Luke	PHX
<i>Buckeye Municipal</i>								
Expand Runway	-1	0	0	0	-1	0	0	0
Precision Approach	0	0	0	0	-2	0	-2	0
<i>Chandler Municipal</i>								
Expand Runway	0	0	0	0	0	0	0	0
Precision Approach	0	0	0	0	-1	0	-1	0
<i>Glendale Municipal</i>								
Precision Approach	0	0	0	0	-1	-2	-1	-2
<i>Memorial</i>								
Reopen	0	0	0	0	0	0	0	0
Non-precision Approach	0	0	0	0	0	0	0	0
<i>Mesa Falcon Field</i>								
Precision Approach	0	0	0	0	0	-2	0	-2
<i>Phoenix-Deer Valley</i>								
Parallel Runway	0	0	0	0	-1	0	0	0
Precision Approach	0	0	0	0	0	0	0	0
<i>Phoenix-Goodyear</i>								
Parallel Runway	0	0	0	0	-1	0	0	0
Precision Approach	0	0	0	0	-2	0	-2	0
<i>Phoenix-Sky Harbor International</i>								
4 <sup>th</sup> Runway	0	0	0	0	-1	0	0	0
Precision Approach	0	0	0	0	-1	0	0	0
<i>Pleasant Valley</i>								
Pave Runway & Parallel Taxiway	0	0	0	0	-1	0	0	0
Non-precision Approach	0	0	0	0	-1	0	-1	0
<i>Scottsdale</i>								
Parallel Taxiway	0	0	0	0	0	0	0	0
Precision Approach	0	0	0	0	0	-1	0	-1
<i>Wickenburg Municipal</i>								
Non-precision Approach	0	0	0	0	-1	0	-1	0
<i>Williams Gateway</i>								
Runway Extension	0	0	0	0	-1	0	0	0
Precision Approach	0	0	0	0	-1	0	-1	0
<i>New GA Airports</i>								
Peoria/Pleasant Valley	0	0	0	0	0	0	-2	0
Wickenburg/Forepaugh	0	0	0	0	0	0	-1	0
New-South/Southeast	0	0	0	0	0	0	-1	0

**Table 5.20**  
**Evaluation of Airspace Impacts by Alternative**

Airport/Project	Status Quo		Improved Tech.		Max. Devel.		New Airports	
	Luke	PHX	Luke	PHX	Luke	PHX	Luke	PHX
New-Northeast Search Area	0	0	0	0	0	0	-1	0
<i>New Commercial Airports</i>								
Expand Williams-Gateway	0	0	0	0	0	0	-1	-2
New-North Search Area	0	0	0	0	0	0	-2	-2
New-South Search Area	0	0	0	0	0	0	-1	-2

Source: R.A. Wiedemann & Associates, Discussions with Luke AFB Personnel & Phoenix TRACON personnel

The total scores for each alternative had to be adjusted slightly in order to avoid duplicate counting. For example, the New Airport Development alternative shows a total of 7 potential new airports (3 commercial service and 4 general aviation) when in fact, only one commercial service and one general aviation facility would be developed. Therefore, the lowest scoring commercial option and the lowest scoring general aviation option were included in the scoring summary. As such, the following cumulative impacts could be assigned:

<u>Alternative</u>	<u>Total Score</u>	<u>Equivalent</u>
<input type="checkbox"/> Improved Technology	0 points	Neutral
<input type="checkbox"/> Status Quo	-1 points	Neutral
<input type="checkbox"/> New Airport Development	-18 points	Moderate
<input type="checkbox"/> Maximized Airport Development	-21 points	Moderate to Severe

**Table 5.21** summarizes the airspace compatibility evaluation in similar fashion to the previous criteria.

**Table 5.21**  
**Summary of Airspace Compatibility Evaluation**

Evaluation Criteria	Status Quo	Improved Technology	Maximized Airport Development	New Airport Development
Airspace Compatibility	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

- ☐ Limited Impact
- ☒ Moderate Impact
- ☒ Significant Impact

Of the two action alternatives (Maximized Airport Development and New Airport Development), the New Airport Development alternative had a smaller cumulative impact and thus ranked better than the Maximized Airport Development alternative.

### **Ease of Implementation**

The various RASP development alternatives present options for facility improvements at system airports. These options primarily address accommodating projected aviation demand within the system during the course of the study period ranging from the implementation of facilities currently under design and development, to expansions to facilities above and beyond those identified in previous planning efforts, as well as potential new airport sites. Some of these options would be relatively easy to implement, while

others would require significant additional study and evaluation by the local airport and the surrounding communities.

Evaluation of each of the individual alternatives to determine the relative ease, or lack thereof, anticipated in implementing the recommendations was conducted. Issues such as community support for the airport, identification of recommended facilities on an approved airport layout plan, compatibility with existing community comprehensive plans, the status of the airport – inclusion in the NPIAS, public or private ownership, availability of airport land to accommodate development, etc. are assessed to determine potential impediments to developing recommended facilities. A determination that the ease of implementation would be “high” indicates that it is considered to have a higher chance of being implemented. A determination of “low” indicates that it is anticipated that it will be difficult to implement the proposed improvement due to factors discussed in this paragraph.

#### Status Quo Alternative

The ease of implementing the Status Quo alternative is considered to be high, as the projects included in the Status Quo are currently programmed and are either ready for construction or have been completed. These include runway extensions at Buckeye, Glendale, and Wickenburg. These projects have been through the appropriate planning, environmental, and design phases, indicating that they have been accepted in the local community.

#### Improved Technology Alternative

The Improved Technology alternative requires effort on the behalf of the FAA as well as pilots in order for the alternative to be fully implemented. The FAA has an on-going program, the Operational Evolution Plan (OEP). This rolling 10-year plan’s purpose is to increase the “capacity and efficiency of the National Airspace System while enhancing safety and security.” The most current version of the OEP is 5.0, which was released in December 2002. Improvements that were identified in the plan that were completed include:

- ☐ New runway construction
- ☐ Airspace redesign in Las Vegas
- ☐ Implementation of weather tools
- ☐ Additional approach procedure implementation
- ☐ Installation of equipment in airplanes

These improvements and others identified in the OEP require active participation including funding by the following:

- ☐ FAA (controllers, planners, weather)
- ☐ Department of Defense
- ☐ Pilots (commercial and general aviation)
- ☐ Airlines
- ☐ Airport owners

This level of required participation indicates that the ease of implementation would be moderate for the Improved Technology alternative in the MAG RASP. Budgetary constraints imposed on government and private business due to short-term economic conditions would undoubtedly impact the ability of the FAA to effectively meet the OEP goals set for the next 10 years.



### Maximized Airport Development Alternative

The Maximized Airport Development alternative includes the development of parallel runways, longer runways, and more sophisticated approaches at many of the Region's airports. To evaluate the ease of implementation, each airport was examined independently. The airport-specific evaluations are summarized below.

#### ❑ **Buckeye Municipal**

The Maximized Airport Development alternative includes development of a longer runway and a precision instrument approach at Buckeye. In terms of ease of implementation, Buckeye's most recent Master Plan shows two runway extensions, one in the short term and one in the long term. The short term extension of 1,200 feet is included in the Status Quo alternative. Long term, an extension of 1,800 feet, an upgrade of the airport to meet C-II design standards (which would allow larger aircraft to operate at the airport), as well as installation of equipment to support a precision approach were identified in the plan. These projects were depicted on the airport's approved airport layout plan. Extension of the runway in the long term would require the relocation of one road, but it appears that plans have been made to accommodate this relocation. Development of this runway extension would require additional environmental study and coordination with the Town of Buckeye to obtain funding for the project. Ease of implementation for Buckeye's development in the Maximized Airport Development alternative is considered high.

#### ❑ **Chandler Municipal**

Development of a longer runway, upgraded design standards, and a precision approach were identified for Chandler as part of the Maximized Airport Development alternative. The airport's Master Plan includes the development of a longer runway, phased such that there are extensions to both ends of Runway 4R/22L. Property acquisition and road relocation (Queen Creek and Germann) would be required to support this runway extension. Noise is an issue in Chandler and the airport has worked with the local community, as well as pilots, to address the concerns. Ease of implementation for Chandler's development in the Maximized Airport Development alternative is considered moderate.

#### ❑ **Estrella Sailport**

No significant upgrades are recommended for Estrella. Therefore, the ease of implementation for Estrella under the Maximized Airport Development alternative is considered high.

#### ❑ **Gila Bend Municipal**

Projects identified in the Maximized Airport Development alternative for Gila Bend include upgrading the strength of the runway and development of a non-precision instrument approach. These projects have been identified through RASP and other studies (Navigational Aids and Aviation Services Special Study) and have not been addressed in recent airport-specific studies. While these projects would not likely generate significant public interest, their potential for implementation is hampered as they have not been identified by the airport in the planning or capital improvement processes. The ease of implementation for Gila Bend Municipal under the Maximized Airport Development alternative is considered moderate.

#### ❑ **Glendale Municipal**

The Maximized Airport Development alternative addresses development of the full parallel taxiway for the runway extension recently constructed and another full parallel taxiway on the east side of the runway, as well as a precision instrument approach. Extension of the existing taxiway and development of the full parallel on the east side are included in the airport's Master Plan, is depicted in its most recent airport layout plan, and is identified in the ADOT CIP. Development of the precision instrument approach has been noted to be difficult due to airspace issues, which are addressed in a separate section of this analysis. Full development of the projects for Glendale included in the Maximized Airport Development alternative has been rated as low in terms of ease of implementation, primarily due to the precision instrument approach. The ease of implementation for the taxiway extension should be high.

❑ **Memorial**

Restoration of the runway, development of a full parallel taxiway, and a non-precision approach were identified for Memorial as part of the Maximized Airport Development alternative. Restoration of Memorial has been discussed previously, with no progress made toward making the airport more usable. The most significant issue is the number of private landowners associated with the airport. FAA funding could be sought if the airport was held by a single public entity. The airport is owned by members of the Gila River Indian Community, is not currently eligible for State funding, and is not currently included in the FAA's National Plan of Integrated Airport Systems. The ease of implementation related to Memorial under the Maximized Airport Development alternative is considered low.

❑ **Mesa Falcon Field**

The most significant improvement identified for Mesa as part of the Maximized Airport Development alternative is provision of a precision instrument approach. A precision instrument approach (RNAV/GPS) was recommended as part of the "Navigational Aids and Aviation Service Special Study" conducted by ADOT. The airport's master plan only addresses development of a non-precision instrument approach. The ease of implementation related to Mesa implementing a precision approach as identified in the Maximized Airport Development alternative is considered moderate.

❑ **Phoenix – Deer Valley**

Significant projects identified in the Maximized Airport Development alternative for Deer Valley include an additional parallel runway and an associated parallel taxiway and development of a precision instrument approach. The alternative also includes the development of a considerable number of aircraft storage spaces to accommodate projected based aircraft demand. The airport's master plan did not identify another runway or development of a precision instrument approach. The airport has recently purchased additional land to accommodate future storage. The airport has identified areas for development of storage facilities. Implementation of a parallel runway at Deer Valley would require environmental study and justification in order to qualify for federal funding. The area around the airport continues to grow with additional residential development in this north Phoenix area. Implementation of the precision instrument approach is more significant, as the most likely issue is airspace compatibility which is addressed in a subsequent section of this analysis. The ease of implementation for Deer Valley under the Maximized Airport Development alternative is considered moderate.

❑ **Phoenix – Goodyear**

The Maximized Airport Development alternative addresses development of a parallel runway/taxiway system, as well as a precision instrument approach and significant aircraft storage facilities. A parallel runway was addressed as a potential long-term project for Goodyear. A parallel runway would provide additional flexibility and operational capacity for the airport. The airport's planning study also recommended development of a non-precision instrument approach and additional aircraft storage facilities. Development of the precision instrument approach has not been analyzed for Goodyear. Full development of the projects for Goodyear included in the Maximized Airport Development alternative, especially the precision instrument approach, has been rated as moderate in terms of ease of implementation.

❑ **Phoenix – Sky Harbor International**

The most significant improvement identified for Sky Harbor as part of the Maximized Airport Development alternative is development of a fourth runway. The airport's third runway was opened in October 2000 after being recommended in the 1989 master plan, with significant environmental review and mitigation required. One of the most substantial requirements relates to the flight path that aircraft departing east must use as established as part of the 1994 Intergovernmental Agreement between the cities of Phoenix and Tempe. Development of a fourth runway is not included in the airport's most recent master plan and is not addressed in the airport layout plan. A fourth runway to the north of the existing airfield would require relocation of Allied Signal/Honeywell facilities, a major employer in the Region. The ease of implementation for Sky Harbor under the Maximized Airport Development alternative is considered low.

❑ **Pleasant Valley**

Development of a paved runway and parallel taxiway and a non-precision approach were identified for Pleasant Valley as part of the Maximized Airport Development alternative. Pleasant Valley has previously been studied as a potential site for a new Peoria airport (see New Airport Development alternative below). As part of this study, it was recommended that a paved runway be developed at the airport with the existing turf runways remaining for the recreational activities. A master plan was completed for the new Peoria airport, but construction of the airport was not pursued. The existing airport site is located on State land and is leased to a private operator, who has noted that it is possible that the State may choose not to lease the land in the future. The ease of implementation related to Pleasant Valley for the Maximized Airport Development alternative is considered moderate.

❑ **Scottsdale**

The most significant improvement identified for Scottsdale as part of the Maximized Airport Development alternative is provision of a precision instrument approach. A precision instrument approach (RNAV/GPS) was recommended as part of the “Navigational Aids and Aviation Service Special Study” conducted by ADOT. The airport’s master plan does not address provision of a precision instrument approach. The ease of implementation related to Scottsdale implementing a precision approach as identified in the Maximized Airport Development alternative is considered moderate.

❑ **Sky Ranch Carefree**

No significant upgrades are recommended for Sky Ranch Carefree. Therefore, the ease of implementation for Sky Ranch Carefree under the Maximized Airport Development alternative is considered high.

❑ **Stellar Airpark**

No significant upgrades are recommended for Stellar. Therefore, the ease of implementation for Stellar under the Maximized Airport Development alternative is considered high.

❑ **Wickenburg Municipal**

Projects identified in the Maximized Airport Development alternative for Wickenburg Municipal include development of a non-precision instrument approach. A runway extension was recently analyzed as part of the airport’s master plan which recommended that, instead of extending the runway to the ultimate proposed length of 7,500 feet, that the Town of Wickenburg consider redeveloping the Forepaugh Airport to meet higher airport design standards (C-II). It was noted that the existing airport site is constrained by current uses around the airport. A non-precision approach was recommended for the airport. Due to the recent study’s recommendations, the ease of implementation for Wickenburg Municipal under the Maximized Airport Development alternative is considered low.

❑ **Williams Gateway**

The Maximized Airport Development alternative addresses development of an additional runway, extension of an existing runway, additional terminal building space, and development of a precision instrument approach for Williams Gateway. While Williams Gateway currently has three parallel runways, development of a fourth runway, possibly in another orientation, could enhance the operational capacity of the airport. The current runway alignments conflict with full utilization of the system when Phoenix-Sky Harbor International is operating at a normal pace. Departures to the northeast from Williams Gateway are generally limited. Development of an additional runway to the south could provide new opportunities for operational flexibility at Williams Gateway. Development of a precision approach for this runway could also potentially work given a more east-west alignment. It was recently announced that the Ford facility would be vacated and the property may be available for airport development. Full development of the projects for Williams Gateway included in the Maximized Airport Development alternative has been rated as moderate in terms of ease of implementation.

### New Airport Development Alternative

The New Airport Development alternative addresses only the development of new airports in the Region and assumes the existing airports do not have significant facility development. For purposes of the analysis, it is assumed that one new general aviation and one new commercial service airport would be constructed. Analysis was conducted for the four general aviation sites and three commercial service sites. To evaluate the ease of implementation for the New Airport Development alternative, each airport site was examined independently. It should be noted that detailed airspace analyses were not performed to determine if the sites were feasible from an airspace perspective. The cursory review previously discussed provides the only analysis of airspace. The airport-specific evaluations are summarized below.

#### ❑ **New Forepaugh GA**

The New Forepaugh site is located remotely from the major population centers. The most significant issues associated with development of this new airport include cost and airspace interaction. This airport is also not likely to sufficiently attract a high level of demand away from the airports in the MAG system that are currently experiencing capacity delays. The airport has been recommended as part of the Wickenburg master plan as a replacement site and therefore is rated high for ease of implementation.

#### ❑ **New Peoria GA**

The New Peoria site has been carried forward from previous studies that recommended development of the existing Pleasant Valley Airport into a full-service general aviation airport. A master plan was completed for the new Peoria airport, but construction of the airport was not pursued. As previously discussed, the existing airport site is located on State land and is leased to a private operator, who has noted that it is possible that the State may choose not to lease the land in the future. The ease of implementation related to the New Peoria site as part of the New Airport Development alternative is considered moderate.

#### ❑ **New East Valley GA**

The New East Valley site was identified as part of this RASP through review of existing documentation and the regional airport locations. Demand for aviation in east/northeast Phoenix continues to grow as does the population base. While the area's growth is limited due to the Tonto National Forest and existing Indian communities, there is still growth potential in this corridor. The location of the site in this area of National Forest and existing Indian communities impacts its potential implementation, as does the need for a public sponsor for the airport. It would be important that a public sponsor was obtained to develop a site feasibility and selection analysis. Significant study would be required in order to implement a new airport in this area if federal or state funding was sought, as would be needed for a new airport in any region. The ease of implementation related to the New East Valley site as part of the New Airport Development alternative is considered moderate.

#### ❑ **New South Valley GA**

A New South Valley site was located south of Maricopa County along the I-10 corridor. The corridor just south of Phoenix headed south is rapidly growing as the boundaries of the metropolitan area continue to expand. The majority of the land in this region is within the Gila River Indian Community, which would likely need to support this facility. This Community is the sponsor for the existing Memorial Airport, which is currently in a state of disrepair. The Community has expressed an interest in restoring the airport, indicating that a potential may exist. The Memorial Airport may not be able to be restored given land ownership issues, which may present an opportunity for development of another airport within the Community's land envelope. Again, if federal monies were sought for development of the airport, significant study would be required. Coordination with Pinal County officials would also be important in the feasibility analysis. The ease of implementation related to a New South Valley site as part of the New Airport Development alternative is considered moderate.

❑ **New North Commercial**

The New North Commercial site was reviewed on a cursory level by the City of Phoenix. As part of its analysis, it was determined that the most significant issues that would inhibit development of this type of facility in the general area were Luke AFB activity and topography that limits airspace patterns. The results of this analysis indicate that the ease of implementation for the New North Commercial site is low.

❑ **New RAFA Commercial**

The New RAFA Commercial site was recommended as part of a 1993 study conducted by the Governor's Regional Airport Advisory Committee. This study, the *Arizona Regional Airport Feasibility Assessment (RAFA) Study*, contained three recommendations. The first was that a regional airport was needed, second that the airport should be near the Phoenix Metropolitan area, and third that a planning team should be created/implemented. Three sites were selected including Williams Gateway, Casa Grande, and Coolidge. The site selected for review in the RASP is the Casa Grande site as Williams is also an alternative in the New Airport Development scenario. The most significant issues identified as part of the RAFA study included who should own the airport, who should operate the airport, and how it should be coordinated with Sky Harbor and Tucson. Specific issues regarding the Casa Grande site included locating an airport on the Indian Community land, as the airport met the airspace and land area requirements identified, as well as could meet the access requirements if it were located close to I-10. Given the recent lack of interest in the pursuit of this airport, the ease of implementation for the New RAFA Commercial site is rated moderate, as the site could still be pursued in the future.

❑ **Supplemental Williams Commercial**

Development of Williams as a Supplemental Commercial site was also evaluated as part of the RAFA study. The most significant issues identified in the study included that additional land was needed. Williams Gateway currently serves as a commercial airport, with limited existing activity. The airport and the community are interested in Williams developing into this role in the future. A structure is currently in place for the airport, including a marketing function for the pursuit of additional commercial airline and cargo service. This structure could support the airport's role as a secondary commercial service airport in the Region. Implementation of additional airline service and true function as a supplemental commercial service airport is limited primarily by the lack of need for airlines to either relocate from Phoenix-Sky Harbor International or to open a second base of operations at Williams Gateway. Secondary airports are operated in many cities such as Los Angeles, San Francisco, Chicago, Houston, and Dallas. In some cases the airports grew as secondary airports due to limited growth opportunities at the existing commercial airport site, or growth of secondary areas in the metropolitan regions. Over the long term, it is possible that this type of growth could occur in Phoenix and that demand that could not be served at Phoenix-Sky Harbor International could locate at Williams Gateway. Therefore, the ease of implementation for a Supplemental Williams Commercial site is rated moderate.

**Table 5.22** summarizes the ease of implementation evaluation.

**Table 5.22**  
**Summary of Ease of Implementation Evaluation**

<b>Evaluation Criteria</b>	<b>Status Quo</b>	<b>Improved Technology</b>	<b>Maximized Airport Development</b>	<b>New Airport Development</b>
Ease of Implementation	❑	❑	❑	■

- ❑ Limited Impact
- ❑ Moderate Impact
- Significant Impact

## Title VI

Title VI requires that federal studies identify and address “disproportionately high and adverse human health or environmental effects, including interrelated social and economic effects, of proposed programs, policies, and activities on minority populations and low-income populations in the United States.” In simple language, any proposed action must not impose greater impacts on low and minority income populations than on other segments of the general population in a community.

To evaluate the impact of the alternatives on these segments of the local population, US Census data for the MAG study area was compiled by Census tract, including income and ethnic composition. This data was analyzed using the existing and future noise contours and noise impact areas for the respective system airports. Utilizing geographic information systems (GIS) analysis, the populations within the existing and future noise contours and noise impact areas were assessed to understand the profile of the impacted population by income level and ethnic origin. The relative percentage of minority and low income populations impacted is compared to the total population impacted by the respective alternatives to identify, if present, disproportionate impacts on these low income and minority populations relative to the community as a whole. Alternatives that result in greater impacts to minority and low income residents can be expected to result in lower scores than those that do not disproportionately impact these populations.

### Status Quo Alternative

**Exhibit 5.11** depicts the potential noise impacts on Title VI populations that may be associated with the Status Quo alternative. As shown in Exhibit 5.11, the noise contours and noise impact areas (boxes) were overlaid on 2000 Census data at the tract level to determine the impacts. **Table 5.23** summarizes the impacts on Title VI populations and households according to data recorded in U.S. Census 2000.

**Table 5.23**  
**Summary of Title VI Impacts**  
**Status Quo Alternative**

Airport Name	Title VI Impacts		
	Acres	%Pop	%HH
Buckeye Municipal	243	12%	9%
Chandler Municipal	578	5%	6%
Estrella Sailport	48	NA	NA
Gila Bend Municipal	104	19%	18%
Glendale Municipal	864	2%	2%
Memorial	83	100%	100%
Mesa Falcon Field	3,053	4%	4%
Phoenix - Deer Valley	3,528	7%	6%
Phoenix - Goodyear	1,768	15%	11%
Phoenix - Sky Harbor International	7,861	39%	33%
Pleasant Valley	66	4%	5%
Scottsdale	658	3%	3%
Sky Ranch Carefree	124	5%	6%
Stellar Airpark	57	34%	35%
Wickenburg Municipal	200	12%	9%
Williams Gateway	4,057	8%	7%

Source: U.S. Census 2000

As described earlier, the Status Quo alternative can be characterized as a “do-nothing” approach, where the conditions remain similar to those currently, with the exception of some changes in noise impact caused by projects that are already funded and programmed for construction in the near future. As shown in Table 5.23, the overall noise impact of the Status Quo alternative on Title VI populations is moderate. However, noise contours for Memorial has been found to cause “disproportionately” high and adverse human health or environmental effects on low-income populations within the future 65 DNL noise contour. While impacts near some airports are higher than desired, no other airports were found to have a “disproportionately” high impact as defined in Title VI.

#### Improved Technology Alternative

Under the Improved Technology alternative, noise impacts on Title VI populations are assumed to be the same as under the Status Quo alternative.

#### Maximized Airport Development Alternative

As previously discussed, the Maximized Airport Development alternative includes the development of several types of improvements at many of the Region’s airports to provide additional operating capacity. These improvements include additional runways, longer runways, and either expanded or new precision instrument approaches. In terms of a noise impact, the development of runway improvements, including extensions to existing runways, paving, or development of additional runways, all have the potential to result in additional noise impacts. For purposes of this analysis, however, the provision of a precision instrument approach was assumed to not have a significant noise or Title VI impact.

**Exhibit 5.12** depicts the potential noise impacts on Title VI populations that may be associated with the Maximized Airport Development alternative. As shown in Exhibit 5.12, the noise contours and noise impact areas (boxes) were overlaid on 2000 Census data at the tract level to determine the impacts.

The Maximized Airport Development alternative can be characterized as an approach where improvement projects are maximized at existing airport facilities. The overall noise impact of the Maximized Airport Development alternative on Title VI populations remains moderate, as no noise contours or impact areas associated with the Maximized Airport Development alternative have been found to cause “disproportionately” high and adverse human health or environmental effects on low-income populations in Maricopa County.

#### New Airport Development Alternative

As already discussed, the New Airport Development alternative assumes the same system capacity as in the Status Quo alternative. The focus of examining new airports is to analyze their impact on the existing system. While several airports are discussed in this evaluation, it is assumed that only one new general aviation and one new commercial service airport would be developed in the Region.

**Exhibit 5.13** depicts the potential noise impacts on Title VI populations that may be associated with the New Airport Development alternative. As shown in Exhibit 5.13, the noise contours and noise impact areas (boxes) were overlaid on 2000 Census data at the tract level to determine the impacts. The following descriptions summarize the extent to which Title VI populations are impacted as a result of implementing the New Airport Development alternative, by airport. **Table 5.24** summarizes the impacts on Title VI populations that may be anticipated under the New Airport Development alternative.

**Table 5.24**  
**Summary of Title VI Impacts**  
**New Airport Development Alternative**

Airport Name	Title VI Impacts		
	Acres	%Pop	%HH
New East Valley GA	186	4%	6%
New Forepaugh GA	931	12%	9%
Peoria GA (Pleasant Valley)	928	4%	5%
New South Valley GA	928	NA	NA
New North Commercial	928	12%	9%
New RAFA Commercial	928	NA	NA
Supp.Comm. (Williams Gateway)	4,497	7%	6%

Source: Wilbur Smith Associates

The New Airport Development alternative, as discussed above, considers the development of several new general aviation and commercial service airports. The New Airport Development alternative does consider expansion opportunities at Pleasant Valley and Williams Gateway, no other improvements at existing facilities are included. The overall noise impact of the New Airport Development alternative on Title VI populations is moderate, while no noise contours or impact areas have been found to cause “disproportionately” high and adverse human health or environmental effects on low-income populations in Maricopa County.

#### Summary of Title VI

As discussed in this evaluation, the noise impacts associated with the various development alternatives constitute no significant impact on low-income people or households. While there are noise impacts on areas with moderate to high amounts of people reporting income below poverty level (Sky Harbor, Stellar, Memorial), these impacts are not induced by the implementation of the alternatives. In fact, the high level Title VI populations impacted by Memorial are those that currently experience noise impacts under the Status Quo alternative, where no improvement projects are considered. Therefore, the overall noise impact of the alternatives on Title VI populations is limited, as no future noise contours or future noise impact areas have been found to cause “disproportionately” high and adverse human health or environmental effects on low-income populations in Maricopa County.

**Table 5.25** indicates the impact of the alternatives on Title VI populations.

**Table 5.25**  
**Summary of Title VI Evaluation**

	Status	Improved	Maximized	New
Evaluation Criteria	Quo	Technology	Airport Development	Airport Development
Title VI	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- ☐ Limited Impact
- ☒ Moderate Impact
- ☐ Significant Impact



## FAA/ADOT Design Compliance

Each of the MAG system airports has been assigned an FAA Airport Reference Code (ARC), which reflects existing and anticipated aircraft expected to use the respective facilities throughout the study period. FAA has established design criteria that are applicable to the specific ARCs. An assessment of the current and future compliance of each airport with the design criteria associated with their respective ARC was made. A facility that meets current and projected design criteria would receive a higher score than a similar facility that does not presently and cannot in the future meet the associated design criteria, either through physical, financial, or political constraints.

Specific airport development varies, based on the four alternatives. The Status Quo alternative proposes minimal airport development, which is included in the current ADOT CIP. The Improved Technology alternative represents a subset of the Status Quo alternative and only includes development of those facilities in the current ADOT CIP and facilities associated with on-airport technology improvements, such as the local area augmentation system (LAAS) and wide area augmentation system (WAAS).

The Maximized Airport Development alternative assumes development of all facilities in accordance with FAA and ADOT design criteria, other than those situations where existing constraints prohibit meeting specific design criteria and a modification to standards is currently in place. The New Airport Development alternative assumes that any new airports would be developed to meet applicable FAA and ADOT design guidelines. **Table 5.26** lists the FAA/ADOT design compliance for runway length, by airport for each of the four alternatives.

**Table 5.26**  
**Design Compliance - Runway Length**

Airport Name	ARC		Status Quo	Improved Technology	Maximized Development	New Airports
	Exist.	Prop.				
Buckeye Municipal	B-II	C-II	■	■	■	■
Chandler Municipal	B-II	C-II	■	■	■	■
Estrella Sailport	A-I	A-I	■	■	■	■
Gila Bend Municipal	B-II	B-II	■	■	■	■
Glendale Municipal	B-II	C-II	□	□	■	□
Memorial	C-III	C-III	■	■	■	■
Mesa Falcon Field	B-II	B-II	■	■	■	■
Phoenix-Deer Valley	D-II	D-II	■	■	■	■
Phoenix-Goodyear	D-IV	D-IV	■	■	■	■
Phoenix-Sky Harbor International	D-V	D-V	■	■	■	■
Pleasant Valley	B-I	B-I	■	■	■	■
Scottsdale	D-II	D-II	■	■	■	■
Sky Ranch Carefree	B-I	B-I	□	□	■	□
Stellar Airpark	B-II	B-II	■	■	■	■
Wickenburg Municipal	B-I	C-II	□	□	■	□
Williams Gateway	D-V	D-V	□	□	■	□
New GA Airport	N.A.	C-II	N.A.	N.A.	N.A.	■
New Commercial Service Airport	N.A.	C-III	N.A.	N.A.	N.A.	■
<b>ALTERNATIVE COMPLIANCE</b>			■	■	■	■

■ Meets facility recommendations

■ Meets some facility recommendations

□ Does not meet facility recommendations

N.A. not applicable

Source: Airport master plans, FAA Advisory Circular 150/5300-13, Maricopa Association of Governments, and WSA analysis

The airport reference codes for four of the existing MAG airports (Buckeye, Chandler, Glendale, and Wickenburg Municipal) are projected to change to a more demanding ARC during the course of the study period, based on information presented in their respective airport master plans. These ARC upgrades, including runway length, would result in increased/expanded facility requirements. Projects identified in the current ADOT CIP would provide the recommended runway length at Buckeye and Glendale Municipal Airports. The recommended runway lengths at Chandler and Wickenburg Municipal Airports would only be implemented in the Maximized Airport Development alternative. The Status Quo, Improved Technology, and New Airport Development alternatives would therefore result in the inability of these two airports to achieve the requirements of the upgraded airport reference codes. These three alternatives therefore do not provide the additional runway length required to accommodate the upgraded ARCs.

The primary runway at Williams Gateway Airport currently does not meet the recommended runway length. Only the Maximized Airport Development alternative provides for an extension to the primary runway which would provide the recommended runway length. **Table 5.27** lists the FAA/ADOT design compliance for runway width, by airport for each of the four alternatives.

**Table 5.27**  
**Design Compliance - Runway Width**

Airport Name	ARC		Status	Improved	Maximized	New
	Exist.	Prop.	Quo	Technology	Development	Airports
Buckeye Municipal	B-II	C-II	■	■	■	■
Chandler Municipal	B-II	C-II	□	□	■	□
Estrella Sailport	A-I	A-I	□	□	□	□
Gila Bend Municipal	B-II	B-II	■	■	■	■
Glendale Municipal	B-II	C-II	□	□	■	□
Memorial	C-III	C-III	■	■	■	■
Mesa Falcon Field	B-II	B-II	■	■	■	■
Phoenix-Deer Valley	D-II	D-II	■	■	■	■
Phoenix-Goodyear	D-IV	D-IV	■	■	■	■
Phoenix-Sky Harbor International	D-V	D-V	■	■	■	■
Pleasant Valley	B-I	B-I	■	■	■	■
Scottsdale	D-II	D-II	■	■	■	■
Sky Ranch Carefree	B-I	B-I	□	□	■	□
Stellar Airpark	B-II	B-II	□	□	□	□
Wickenburg Municipal	B-I	C-II	□	□	■	□
Williams Gateway	D-V	D-V	■	■	■	■
New GA Airport	N.A.	C-II	N.A.	N.A.	N.A.	■
New Commercial Service Airport	N.A.	C-III	N.A.	N.A.	N.A.	■
<b>ALTERNATIVE COMPLIANCE</b>			■	■	■	■

■ Meets facility recommendations

■ Meets some facility recommendations

□ Does not meet facility recommendations

N.A. not applicable

Source: Airport master plans, FAA Advisory Circular 150/5300-13, Maricopa Association of Governments, and WSA analysis

As discussed previously, the airport reference codes for Buckeye, Chandler, Glendale, and Wickenburg Municipal airports are projected to change to a more demanding ARC during the course of the study period, based on information presented in their respective airport master plans. These ARC upgrades, including, result in greater runway width requirements. Projects identified in the current ADOT CIP at Buckeye and Glendale Municipal Airports provide the recommended runway width. The recommended

runway widths at Chandler and Wickenburg Municipal Airports would only be implemented in the Maximized Airport Development alternative. The recommended runway widths at Chandler and Wickenburg Municipal Airports would only be implemented in the Maximized Airport Development alternative. These two airports would therefore not meet the requirements of the upgraded airport reference codes in the Status Quo, Improved Technology, and New Airport Development alternatives.

Estrella Sailport, Sky Ranch Carefree Airport, and Stellar Airpark do not currently meet the recommended FAA runway width requirements. Estrella Sailport and Stellar Airpark would not meet the requirements under any of the alternatives, since they are non-NPIAS facilities and ineligible for federal funding. The runway at Sky Ranch would be widened to meet the FAA recommended runway width only under the Maximized Airport Development alternative.

The Status Quo, Improved Technology, and New Airport Development alternatives therefore do not provide the additional runway width required to accommodate the upgraded ARCs.

**Table 5.28** lists the FAA/ADOT design compliance for runway strength, by airport for each of the four alternatives.

**Table 5.28**  
**Design Compliance - Runway Strength**

Airport Name	ARC		Status	Improved	Maximized	New
	Exist.	Prop.	Quo	Technology	Development	Airports
Buckeye Municipal	B-II	C-II	■	■	■	■
Chandler Municipal	B-II	C-II	□	□	■	□
Estrella Sailport	A-I	A-I	□	□	□	□
Gila Bend Municipal	B-II	B-II	□	□	■	□
Glendale Municipal	B-II	C-II	■	■	■	■
Memorial	C-III	C-III	□	□	■	□
Mesa Falcon Field	B-II	B-II	■	■	■	■
Phoenix-Deer Valley	D-II	D-II	■	■	■	■
Phoenix-Goodyear	D-IV	D-IV	■	■	■	■
Phoenix-Sky Harbor International	D-V	D-V	■	■	■	■
Pleasant Valley	B-I	B-I	□	□	■	□
Scottsdale	D-II	D-II	■	■	■	■
Sky Ranch Carefree	B-I	B-I	■	■	■	■
Stellar Airpark	B-II	B-II	□	□	□	□
Wickenburg Municipal	B-I	C-II	□	□	■	□
Williams Gateway	D-V	D-V	■	■	■	■
New GA Airport	N.A.	C-II	N.A.	N.A.	N.A.	■
New Commercial Service Airport	N.A.	C-III	N.A.	N.A.	N.A.	■
<b>ALTERNATIVE COMPLIANCE</b>			■	■	■	■

■ Meets facility recommendations

■ Meets some facility recommendations

□ Does not meet facility recommendations

N.A. not applicable

Source: Airport master plans, FAA Advisory Circular 150/5300-13, Maricopa Association of Governments, and WSA analysis

The more demanding airport reference codes proposed for Buckeye, Chandler, Glendale, and Wickenburg Municipal Airports result in greater pavement strength requirements. The projects identified in the current ADOT CIP at Buckeye and Glendale Municipal Airports provide the recommended pavement strength. The recommended pavement strength at Chandler and Wickenburg Municipal Airports would only be

provided in the Maximized Airport Development alternative. The recommended runway widths at Chandler and Wickenburg Municipal Airports would only be implemented in the Maximized Airport Development alternative. These two airports would therefore not meet the requirements of the upgraded airport reference codes in the Status Quo, Improved Technology, and New Airport Development alternatives.

Estrella Sailport and Stellar Airpark would not meet the pavement strength requirements under any of the alternatives, since they are non-NPIAS facilities and ineligible for federal funding. The runway at Sky Ranch would be strengthened to meet the FAA recommended pavement strength only under the Maximized Airport Development alternative. The Status Quo, Improved Technology, and New Airport Development alternatives therefore do not provide the additional pavement strength required to accommodate the upgraded ARCs.

**Table 5.29** lists the FAA/ADOT design compliance for runway-taxiway separation, by airport for each of the four alternatives.

**Table 5.29**  
**Design Compliance - Runway-Taxiway Separation**

Airport Name	ARC		Status	Improved	Maximized	New
	Exist.	Prop.	Quo	Technology	Development	Airports
Buckeye Municipal	B-II	C-II	■	■	■	■
Chandler Municipal	B-II	C-II	■	■	■	■
Estrella Sailport	A-I	A-I	N/A	N/A	N/A	N/A
Gila Bend Municipal	B-II	B-II	□	□	■	□
Glendale Municipal	B-II	C-II	□ <sup>1/</sup>	□ <sup>1/</sup>	□ <sup>1/</sup>	□ <sup>1/</sup>
Memorial	C-III	C-III	N/A	N/A	N/A	N/A
Mesa Falcon Field	B-II	B-II	□ <sup>1/</sup>	□ <sup>1/</sup>	□ <sup>1/</sup>	□ <sup>1/</sup>
Phoenix-Deer Valley	D-II	D-II	■	■	■	■
Phoenix-Goodyear	D-IV	D-IV	■	■	■	■
Phoenix-Sky Harbor International	D-V	D-V	■	■	■	■
Pleasant Valley	B-I	B-I	N/A	N/A	N/A	N/A
Scottsdale	D-II	D-II	□ <sup>1/</sup>	□ <sup>1/</sup>	□ <sup>1/</sup>	□ <sup>1/</sup>
Sky Ranch Carefree	B-I	B-I	N/A	N/A	N/A	N/A
Stellar Airpark	B-II	B-II	N/A	N/A	N/A	N/A
Wickenburg Municipal	B-I	C-II	□	□	■	□
Williams Gateway	D-V	D-V	□	□	■/	□
New GA Airport	N.A.	C-II	N.A.	N.A.	N.A.	■
New Commercial Service Airport	N.A.	C-III	N.A.	N.A.	N.A.	■
<b>ALTERNATIVE COMPLIANCE</b>			■	■	■	■

■ Meets facility recommendations

■ Meets some facility recommendations

□ Does not meet facility recommendations

N.A. not applicable

<sup>1/</sup> The FAA has issued a modification to standard for this separation standard requirement.

Source: MAG, FAA, US Government Flight Information Publication Airport/Facility Directory, Airport master plans, FAA Advisory Circular 150/5300-13, Maricopa Association of Governments, and WSA analysis

The projects identified in the current ADOT CIP at Buckeye Municipal Airport provide the recommended runway to taxiway separation distance. Mesa Falcon Field and Scottsdale Airport runway to taxiway separation distances do not meet the FAA recommended minimums. FAA has issued modifications to standards for these two airports, which represent acknowledgement of the existing deficiencies and FAA's approval of maintaining these existing separation distances. Estrella Sailport, Memorial, Pleasant

Valley, Sky Ranch Carefree Airports and Stellar Airpark are non-NPIAS facilities and ineligible for federal funding. Therefore, these airports are not required to meet the FAA recommended separation criteria. The recommended runway to taxiway separation distances at Chandler Municipal, Phoenix-Deer Valley, Phoenix-Goodyear and Phoenix Sky Harbor International Airports all currently meet the recommended runway to taxiway separation distances. Provision of the recommended runway to taxiway separation distance at Wickenburg Municipal and Williams Gateway Airports would only be accomplished in the Maximized Airport Development alternative.

The Status Quo, Improved Technology, and New Airport Development alternatives would not provide the overall recommended runway to taxiway separation distances.

**Table 5.30** lists the FAA/ADOT design compliance for aircraft storage requirements, by airport for each of the four alternatives.

**Table 5.30**  
**Design Compliance - Aircraft Storage Requirements**

Airport Name	Status Quo	Improved Technology	Maximized Development	New Airports
Buckeye Municipal	■	■	■	■
Chandler Municipal	■	■	■	■
Estrella Sailport	■	■	■	■
Gila Bend Municipal	□	□	■	□
Glendale Municipal	■	■	■	■
Memorial	□	□	■	□
Mesa Falcon Field	■	■	■	■
Phoenix-Deer Valley	■	■	■	■
Phoenix-Goodyear	□	□	■	□
Phoenix-Sky Harbor International	N.A.	N.A.	N.A.	N.A.
Pleasant Valley	□	□	■	□
Scottsdale	■	■	■	■
Sky Ranch Carefree	□	□	■	□
Stellar Airpark	□	□	■	□
Wickenburg Municipal	■	■	■	■
Williams Gateway	■	■	■	■
New GA Airport A	N.A.	N.A.	N.A.	■
New GA Airport B	N.A.	N.A.	N.A.	■
New Commercial Service Airport	N.A.	N.A.	N.A.	■
<b>ALTERNATIVE COMPLIANCE</b>	■	■	■	■

■ Meets facility recommendations

■ Meets some facility recommendations

□ Does not meet facility recommendations

N.A. not applicable

Source: Airport master plans, FAA Advisory Circular 150/5300-13, Maricopa Association of Governments, and WSA analysis

Projects identified in the current ADOT CIP at Buckeye, Chandler, Glendale Municipal, Mesa Falcon Field, Phoenix-Deer Valley, Wickenburg Municipal, and Williams Gateway Airports provide a portion of the aircraft storage facilities, principally aircraft parking apron, recommended to accommodate demand throughout the planning period. Projects currently identified at the Scottsdale Airport provide the facilities necessary to accommodate aircraft storage demands throughout the planning period. Estrella Sailport is not projected to experience any additional aircraft storage facility demand and therefore, this facility meets the aircraft storage requirements for all alternatives. The recommended aircraft storage facilities needed to accommodate projected demand at Gila Bend Municipal, Memorial, Phoenix-Goodyear, Sky

Ranch Carefree Airports, and Stellar Airpark would only be provided in the Maximized Airport Development alternative. These airports would therefore not accommodate the projected aircraft storage demand in the status quo, improved technology, and new airport alternatives.

The Status Quo, Improved Technology, and New Airport Development alternatives therefore, only meet a portion of the projected demand for aircraft storage facilities.

**Table 5.31** presents a summary of the four alternatives ability to meet FAA/ADOT design standards.

**Table 5.31**  
**Summary of FAA/ADOT Compliance Evaluation**

Evaluation Criteria	Status Quo	Improved Technology	Maximized Airport Development	New Airport Development
FAA/ADOT Compliance	■	■	□	■
□ Limited Impact ■ Moderate Impact ■ Significant Impact				

## SUMMARY

The previous sections have provided analysis of the impact of the four alternatives on the nine individual criteria. These sections have not considered the cumulative impact of the criteria that would result from implementation of the alternatives. The summary provides an overall review of the cumulative impacts of the nine criteria, with an emphasis on the individual alternatives.

### Status Quo

The Status Quo alternative serves as the baseline for comparison of the other three alternatives. The alternative still assumes that the same level of demand will be accommodated in the Region, but with the existing facilities in place.<sup>2</sup> Continuation of the Status Quo will have the most significant impact on delay, with less compliance with FAA/ADOT design criteria. If nothing is done to provide additional operating capacity in the Region, delay will result in significant costs to users including airlines, general aviation businesses, passengers, and pilots. While costs can be calculated, there are additional impacts that cannot be quantified such as potential loss of flight training, airline service, and business opportunities. Flight training takes place in the Region due to the optimum weather conditions, however, if students cannot train due to congestion in the airspace and lack of sufficient operating capacity, flight schools may choose to relocate outside the Region in less constrained areas. Airlines experiencing delay to their aircraft and ultimately their passengers may choose to reduce flights, especially frequency, due to the cost of the delay to their operating cost. The economic benefits of the aviation system in Maricopa County are significant, as measured by the Department of Transportation Aeronautics Division's *Aviation Economic Impact Study*. According to the study's results, including multiplier impacts, the general aviation and commercial service airports in Maricopa County are responsible for over 290,000 jobs, payroll of \$6.6 billion, and economic activity of \$20.3 billion. This economic impact could be reduced if the system were not capable of accommodating additional activity projected over the next 25 years. Therefore, while a cost will not be borne to construct additional facilities, it may still result in an economic loss in the Region.

<sup>2</sup> As previously noted, the Status Quo alternative includes currently programmed runway extensions at Buckeye, Glendale, and Wickenburg.

## **Improved Technology**

The Improved Technology alternative's impact to the nine criteria could not be fully analyzed as part of the RASP. Prior to implementation of these technology improvements, an evaluation of impacts would be necessary. Technology improvements were included as an alternative to determine if these improvements alone could provide sufficient capacity enhancement to accommodate the Region's projected increase in aviation activity. The true impacts of improved technology and criteria such as noise, air quality, Title VI, costs, user convenience, and access improvements are not clear. Implementation of improved technology will likely result in improvements to criteria such as delay, but the identified improvements were not significant enough to address the operational capacity deficiency.

## **Maximized Airport Development**

Under the Maximized Airport Development alternative, longer runways are provided at three airports, precision approaches are installed at nine airports, nonprecision approaches are installed at three airports, new runways are constructed or restored at six airports, and additional commercial terminal facilities are built at two airports. This alternative would attempt to make maximum use of the existing Regional airport system by providing enhanced and additional facilities to meet the growing aviation demand in the Phoenix metropolitan area. In this alternative, the specific projects at each airport were evaluated as part of the evaluation to assess the impact of each of these components on the overall alternative. For example, in terms of noise impacts, each airport was evaluated individually to determine the potential noise impacts associated with the airport's proposed development identified in the Maximized Airport Development alternative. This airport-specific analysis provides a more comprehensive means of determining which airport projects are increasing the level of impact associated with the alternative. Therefore, a brief summary of each airport's impacts are described below.

### **❑ Buckeye Municipal**

With a longer runway and a precision approach identified for Buckeye Municipal as part of the Maximized Airport Development alternative, impacts were identified for noise, costs, airspace compatibility, and ease of implementation. The increased noise impact is projected to be minor (approximately 50 additional acres) based on the noise impact box developed as part of the RASP. The level of non-compatible uses is not projected to increase based on the land uses currently identified. Costs would be borne to extend the runway and develop the precision approach (an estimated \$5.7 million), but much of this cost would likely be eligible for FAA funding, with limited local resources required to implement these projects. In terms of airspace compatibility, it is anticipated that with a longer runway and a precision approach, the airport would attract larger, more sophisticated aircraft which has the potential to conflict with Luke's activities. Finally, a runway extension and development of a precision approach would likely require additional environmental study and coordination with the Town of Buckeye. A longer runway and precision approach would not impact air quality, delay, user convenience, access improvements, Title VI, and FAA/ADOT design compliance at Buckeye Municipal.

### **❑ Chandler Municipal**

Under the Maximized Airport Development alternative, Chandler Municipal would extend a runway and develop a precision approach. The criteria that would be most impacted with this development at Chandler Municipal are noise, costs, airspace compatibility, and ease of implementation. Noise impacts would increase primarily due to the extension of the runway, as operations are not projected to increase beyond what was projected as part of the Status Quo alternative. It is estimated that the projects identified as part of the Maximized Airport Development alternative would cost approximately \$20.2 million. Under the Maximized Airport Development alternative, it is anticipated that the airport would develop sufficient facilities to accommodate increased demand for storage as well, contributing significantly to this estimated cost (\$15 million). While the longer runway was not

identified as significantly impacting airspace compatibility, development of the precision approach could have a moderate to severe impact on both Luke and Phoenix-Sky Harbor International depending upon the direction of the approach. Extension of the runway would likely require property acquisition and road relocation, indicating that the ease of implementation would be an issue, in addition to completing the environmental process required to meet federal standards.

❑ **Estrella Sailport**

Estrella Sailport is anticipated to serve the same role as it does today under the Maximized Airport Development alternative. Therefore, no impacts were identified.

❑ **Gila Bend Municipal**

Gila Bend Municipal is anticipated to serve the same role as it does today under the Maximized Airport Development alternative. Therefore, no impacts were identified.

❑ **Glendale Municipal**

Under the Maximized Airport Development alternative, Glendale Municipal would extend a taxiway and develop a precision approach. The criteria that would be most impacted with this development at Glendale Municipal are costs, airspace compatibility, and ease of implementation. The majority of the costs associated with this alternative for Glendale Municipal relate to providing additional aircraft storage facilities, which would enable the airport to meet the projected demand for based aircraft. In terms of airspace compatibility, development of a precision approach at Glendale Municipal has a moderate to severe potential for impacting Luke and Phoenix-Sky Harbor International due to the airport's proximity to Luke and the need for airspace "approach blocks" that are now reserved for Phoenix-Sky Harbor International. These airspace impacts impact the ease of implementation as well, as they would require significant coordination and additional analysis to determine how best to accommodate the military's mission and the airspace needs associated with a precision approach.

❑ **Memorial**

While Memorial is an existing airport in the MAG system, the airport's runway is in disrepair. The Maximized Airport Development alternative calls for Memorial to restore the runway, develop a new taxiway and a nonprecision approach. Cost, airspace compatibility, and ease of implementation were noted to be issues at Memorial with this type of development. The estimated cost for restoring the airport's facilities is \$6.8 million. It has been noted that restoration of the facilities has been pursued in the past, but that due to the number of landowners associated with the airport, the FAA has determined that funding could not be sought until there was a single public entity controlling the facility. Development of a nonprecision approach has the potential to impact other area airports such as Chandler and Stellar, but that limited interaction with Phoenix-Sky Harbor International was anticipated. A nonprecision approach may also impact several low-level routes and the Sells MOA used by Luke.

❑ **Mesa Falcon Field**

A precision approach was identified in the Maximized Airport Development alternative for Mesa Falcon Field. The most significant issue related to a precision approach at Mesa Falcon Field is interaction with Phoenix-Sky Harbor International's airspace. This interaction would also affect the ease of implementation due to the level of coordination and analysis that would be required for this type of approach at the airport. Costs were also noted to be high in this alternative (\$24 million), primarily due to the need for significant aircraft storage at the airport.

❑ **Phoenix-Deer Valley**

Several major projects were identified for Phoenix-Deer Valley as part of the Maximized Airport Development alternative including a parallel runway and a precision approach. As a large reliever airport in the MAG system, Phoenix-Deer Valley provides a high level of operational capacity and base for aircraft, however, expansion of the airport to provide another parallel runway has the potential to impact criteria such as noise, cost, airspace compatibility, and ease of implementation. Expansion of the Phoenix metropolitan area has included areas around Phoenix-Deer Valley, such that noise is considered a potential issue. It is estimated that under the Status Quo and Improved Technology scenarios that approximately 3,528 acres are impacted, with 30 percent of those acres considered non-compatible uses. In the Maximized Airport Development alternative with an



additional parallel runway, the number of impact acres is projected to be 6,717, with 40 percent of the acreage estimated to be non-compatible uses. Under the New Airport Development alternative, if a new general aviation airport is developed on the north end of the metropolitan area, it is estimated that some of the activity at Phoenix-Deer Valley would relocate and that the noise impacts would be reduced to nearly 2,800 acres. The costs associated with the Maximized Airport Development alternative at Phoenix-Deer Valley include a significant level of aircraft storage facilities that could be accommodated if additional operating capacity were provided at the airport, with the total estimated cost for this alternative at \$35.5 million for Phoenix-Deer Valley. A precision approach developed at Phoenix-Deer Valley could have a range of impacts based on the location of the approach. It was noted that an approach from the west would have a severe impact on Luke, but that an approach from the east would not be as severe as long as the level of precision instrument training was not high and that missed approaches remained in the Phoenix TRACON airspace. The airspace issues and the fact that neither a precision approach or a parallel runway have been identified in previous planning efforts published for Phoenix-Deer Valley impacts the ease of implementing the Maximized Airport Development alternative projects at this airport.

❑ **Phoenix-Goodyear**

Under the Maximized Airport Development alternative, Phoenix-Goodyear would construct a parallel runway and develop a precision approach. The analysis that would specify the demand for this runway will consider annual fluctuations in air traffic that are related to the level of flight training activities that occur. With this in mind, the criteria that would be most impacted with this development at Phoenix-Goodyear are noise, costs, airspace compatibility, and ease of implementation. In terms of noise, the Status Quo scenario identified 1,768 acres that are impacted by the Phoenix-Goodyear Airport. With development of a parallel runway, as shown in the Maximized Airport Development alternative, the number of impacted acres increases to 3,611, although the percentage of non-compatible uses stays the same at an estimated 20 percent of the total impacted acreage under the two alternatives. It is estimated that the development identified for Phoenix-Goodyear in the Maximized Airport Development alternative would be \$16.4 million, with a significant portion attributed to aircraft storage facilities. The parallel runway was noted to have a potential moderate to severe impact to Luke's airspace, while the precision approach, especially if from the west, would have a severe impact on Luke's airspace and training operation, as well as Phoenix-Sky Harbor International's arrival and departure routes. Based on this finding, the ease of implementation of the Maximized Airport Development alternative at Phoenix-Goodyear is rated moderate, with the ease of constructing the parallel runway identified as better than development of a precision approach.

❑ **Phoenix-Sky Harbor International**

Several major projects were identified for Phoenix-Sky Harbor International as part of the Maximized Airport Development alternative including a fourth parallel runway with a precision approach and additional terminal building space. The most significant criteria that would be impacted as a result of implementation of this alternative include noise, cost, airspace compatibility, and ease of implementation. Phoenix-Sky Harbor International opened its third runway in 2000. This runway had been officially identified as a project in the airport's 1989 Master Plan. Based on the RASP's analysis of noise, the Status Quo alternative shows 7,861 acres impacted by Phoenix-Sky Harbor International, with approximately 10 percent non-compatible uses. With a fourth runway and additional terminal facilities, the number of impacted acres is estimated at nearly 15,900 with 20 percent currently identified as non-compatible uses. Based on the estimated cost of developing the third runway, the RASP has estimated that with a fourth runway, a runway extension to an existing runway, development of a parallel taxiway, and expansion of the terminal building and parking, the Maximized Airport Development alternative's projects at Phoenix-Sky Harbor International would cost \$1.68 billion. While development of these facilities will not necessarily impact the airport's airspace, the issue of potential impact to Luke was also evaluated. It was noted that with high growth in operational traffic at Phoenix-Sky Harbor International that could be accommodated with a fourth runway and additional terminal space, the routing of traffic into the airport on bad weather days

impacts Luke's ability to operate in its Special Use Airspace (SUA) and its Military Operations Areas (MOAs). In addition, a 1994 Intergovernmental Agreement between the cities of Phoenix and Tempe would need to be addressed in terms of airspace and coordination related to a fourth runway. In terms of ease of implementation, major projects at large commercial service airports such as Phoenix-Sky Harbor International usually require a significant lead time related to project justification, environmental analysis, and public coordination. Development of a fourth runway is not included in the airport's most recent master plan and is not addressed in the airport layout plan. A fourth runway to the north of the existing airfield would require relocation of Allied Signal/Honeywell facilities, making implementation a lengthy process.

❑ **Pleasant Valley**

While Pleasant Valley is an existing airport in the MAG system, the airport's current use is limited based on the facilities at the airport. The Maximized Airport Development alternative calls for Pleasant Valley to pave a runway and parallel taxiway and develop a nonprecision approach. Cost, airspace compatibility, and ease of implementation were noted to be issues at Pleasant Valley with this type of development. The estimated cost for enhancing the airport's facilities is \$3.8 million, with a significant level of funding attributed to aircraft storage. Development of a nonprecision approach or expansion of the airport for a higher aviation use has the potential to impact Luke due to the airport's location relative to Luke. Pleasant Valley has previously been studied as a potential site for a new Peoria airport (see New Airport Development alternative below). Runway paving was recommended as part of a master plan, but construction of the airport was not pursued. It was also noted that the existing airport site is located on State land and is leased to a private operator, who has noted that it is possible that the State may choose not to lease the land in the future, impacting the ease of implementation for the Maximized Airport Development alternative at Pleasant Valley.

❑ **Scottsdale**

The primary project for Scottsdale included in the Maximized Airport Development alternative is a precision approach. Airspace compatibility was noted to be a potential issue, depending upon the direction and routing of the traffic. It has the potential to impact SUA for Luke, as well as Phoenix-Sky Harbor International's arrivals and departures due to the terrain and need for holding airspace. These issues would need to be addressed and impact the ease of implementation of this project as part of the Maximized Airport Development alternative.

❑ **Wickenburg Municipal**

A nonprecision approach was identified in the Maximized Airport Development alternative for Wickenburg Municipal. The potential for impact is moderate to potentially severe for Luke's activity in the Gladden/Bagdad MOA and the traffic pattern for Luke Auxiliary-1 airfield, located in proximity to Wickenburg. The existing airport site was noted to be constrained by current uses around the airport, which may have the potential to impact implementation of a nonprecision approach, in addition to the level of coordination that would be required related to the military airspace interaction.

❑ **Williams Gateway**

Several major projects were identified for Williams Gateway as part of the Maximized Airport Development alternative including an additional runway with a precision approach, extension of an existing runway, and additional terminal building space. The most significant criteria that would be impacted as a result of implementation of this alternative include noise, cost, airspace compatibility, and ease of implementation. Williams Gateway was converted to civilian use in 1993, with the official opening of the new airport in 1994. With the current activity at Williams Gateway, it is estimated that approximately 4,057 acres are impacted by noise, with just 10 percent being non-compatible use. With a new runway, identified as an east-west runway, the number of impacted acres is projected to increase to over 8,700, with an estimated 40 percent of those acres identified as being non-compatible uses. The cost of a new runway/taxiway system, extended runway, and terminal building is estimated at \$361 million. In terms of airspace compatibility, if an east-west runway was developed, it would put traffic flows in line with Phoenix-Sky Harbor International, but would impact SUA for Luke during bad weather conditions similar to the impact that an additional runway at

Phoenix-Sky Harbor International would have. It has been noted that the Ford facility located near Williams Gateway would be vacated and the property may be available for airport development, including possibly a runway. While this enhances the potential implementation, the airspace issues and costs indicate that the ease of implementation would be an issue.

From a system planning perspective, the primary issues noted for the Maximized Airport Development alternative appear to be noise, cost, airspace compatibility, and ease of implementation. While each airport and specific projects were evaluated independently, for the alternatives evaluation, they must also be considered as a whole. In terms of noise, the Maximized Airport Development alternative does appear to impact a higher number of acres with the addition of runways to the existing Regional airport system. In comparison, the New Airport Development alternative would impact a lesser number of acres overall, but would impact new residents that are currently not living near an airport. The Maximized Airport Development alternative assumes that the system will accommodate the tremendous growth projected for based aircraft, including storage facilities. Some of these storage facilities will likely need to be provided under any alternative, but their costs were identified in the Maximized Airport Development alternative. (Costs for storage are also included in the New Airport Development alternative, but not in the Status Quo.) Therefore, while costs were noted to be a significant factor, it is as important to consider the delay costs that will be borne if additional facilities, including storage and operating capacity, are not provided. The Maximized Airport Development alternative was noted to have a lesser impact than the Status Quo in terms of delay, as well as was noted to improve the Regional airports' compliance with FAA and ADOT airport design standards due to its provision of additional facilities that enable the system to meet its demand for operational capacity.

## **New Airport Development**

The New Airport Development alternative evaluated the ability of the existing Regional aviation system to be enhanced to meet projected operational capacity deficiencies through the development of new airports. This alternative looked at four new general aviation airports and three commercial airports, with the analysis focusing on providing the Region with one additional general aviation airport and either a new commercial service airport or enhancement of Williams Gateway as a commercial service airport. For purposes of the alternatives analysis, each airport site was evaluated separately for the majority of the criteria, with the final evaluation of the criteria for the New Airport Development alternative based on the combination of new general aviation and new commercial service airport that resulted in the least impact. A brief summary of the impacts associated with each of the new airport sites is provided below.

### **❑ New Forepaugh GA**

The New Forepaugh site is located remotely from the major population centers (see Exhibit 5.1 for locations of new airports). The most significant issues associated with development of this new airport include cost and airspace interaction. This airport is also not likely to sufficiently attract a high level of demand away from the airports in the MAG system that are currently experiencing capacity delays. The airport has been recommended as part of the Wickenburg master plan as a replacement site. Airspace interaction with Luke impacts the ability of this airport to be developed, especially if it has a long runway and a precision approach.

### **❑ New Peoria GA**

The New Peoria site has been carried forward from previous studies that recommended development of the existing Pleasant Valley Airport into a full-service general aviation airport. A master plan was completed for the new Peoria airport, but construction of the airport was not pursued. As previously discussed, the existing airport site is located on State land and is leased to a private operator, who has noted that it is possible that the State may choose not to lease the land in the future. The ease of implementation related is considered moderate due to the history of the project. Other issues identified for the site include noise, with an estimated 931 acres to be impacted with the airport's development, 60 percent of which is estimated to impact non-compatible uses. In addition, airspace

compatibility is a significant issue related to Luke, as noted in the discussion of the existing Pleasant Valley Airport.

❑ **New East Valley GA**

The New East Valley site was identified as part of this RASP through review of existing documentation and the regional airport locations, and has not previously been studied. While the area's growth is limited due to the Tonto National Forest and existing Indian communities, there is growth potential in this corridor. The location of the site in this area of National Forest and existing Indian communities impacts its potential implementation, as does the need for a public sponsor for the airport. Significant study would be required in order to implement a new airport in this area if federal or state funding was sought, as would be needed for a new airport in any region. The ease of implementation related to the New East Valley site as part of the New Airport Development alternative is considered moderate. Airspace compatibility could be an issue depending upon the location of the airport and its potential interference with low-level routes and SUA.

❑ **New South Valley GA**

A New South Valley site was located south of Maricopa County along the I-10 corridor; this site has not previously been studied. The majority of the land in this region is within the Gila River Indian Community, which would likely need to support this facility. This Community is the sponsor for the existing Memorial Airport, which is currently in a state of disrepair. If federal monies were sought for development of the airport, significant study would be required. Coordination with Pinal County officials would also be important in the feasibility analysis. The ease of implementation related to a New South Valley site as part of the New Airport Development alternative is considered moderate. Airspace compatibility could also be an issue for the New South Valley site depending on its location as there are low-level routes flown by Davis-Monthan AFB and Luke in this vicinity, as well as the Outlaw MOA and R-2310. A location on the west side of Interstate 10 would reduce the potential for impact to Luke.

❑ **New North Commercial**

The New North Commercial site was previously reviewed on a cursory level by the City of Phoenix. As part of its analysis, it was determined that the most significant issues that would inhibit development of this type of facility in the general area were Luke AFB activity and topography that limits airspace patterns. The previous analysis indicates that the ease of implementation for the New North Commercial site is low.

❑ **New RAFA Commercial**

The New RAFA Commercial site was recommended as part of a 1993 study conducted by the Governor's Regional Airport Advisory Committee. Three sites were selected including Williams Gateway, Casa Grande, and Coolidge. The site selected for review in the RASP is the Casa Grande site as Williams is also an alternative in the New Airport Development scenario. The most significant issues identified as part of the RAFA study included who should own the airport, who should operate the airport, and how it should be coordinated with Phoenix-Sky Harbor International and Tucson. Specific issues regarding the Casa Grande site included locating an airport on the Indian Community land, as the airport met the airspace and land area requirements identified, as well as could meet the access requirements if it were located close to I-10. Given the recent lack of interest in the pursuit of this airport, the ease of implementation for the New RAFA Commercial site is rated moderate, as the site could still be pursued in the future.

❑ **Supplemental Williams Commercial**

Development of Williams as a Supplemental Commercial site was also evaluated as part of the RAFA study. The most significant issues identified in the study included that additional land was needed. Williams Gateway currently serves as a small commercial airport, with limited existing activity. The airport and the community are interested in Williams Gateway developing into this role in the future. A structure is currently in place for the airport, including a marketing function for the pursuit of additional commercial airline and cargo service. This structure could support the airport's role as a secondary commercial service airport in the Region. Implementation of additional airline service and true function as a supplemental commercial service airport is limited primarily by the lack of need for

airlines to either relocate from Phoenix-Sky Harbor International or to open a second base of operations at Williams Gateway. Secondary airports are operated in many cities such as Los Angeles, San Francisco, Chicago, Houston, and Dallas. In some cases the airports grew as secondary airports due to limited growth opportunities at the existing commercial airport site, or growth of secondary areas in the metropolitan regions. Over the long term, it is possible that this type of growth could occur in Phoenix and that demand that could not be served at Phoenix-Sky Harbor International could locate at Williams Gateway. The ease of implementation for a Supplemental Williams Commercial site is rated moderate.

Of the sites identified as part of the New Airport Development alternative, it appears that review of new general aviation airports including the New East Valley GA and New South Valley GA may present opportunities that have not previously been studied. While airspace compatibility could present issues with these sites, coordination with the major airspace users and working groups could help to identify specific sites and configurations that would help to provide additional operating capacity needed in the Region, while limiting the impact related to significant issues such as airspace compatibility.

For commercial service airports, the analysis reveals that while opportunities may exist for development of new airports, implementation of the New North Commercial airport is impacted due to airspace compatibility and development of the New RAFA Commercial is limited due to distance from the major metropolitan area in terms of user convenience and lack of a public sponsor for the airport. Development of Williams Gateway as a supplementary commercial service airport appears to have the highest potential to increase commercial opportunities, but does not add additional operating capacity needed in the Region and also has the potential to impact Luke's airspace needs during bad weather conditions.

# APPENDIX A

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## DISCLOSURE MAPS\*

\* **POSTED ON ARIZONA DEPT OF  
REAL ESTATE WEB SITE**

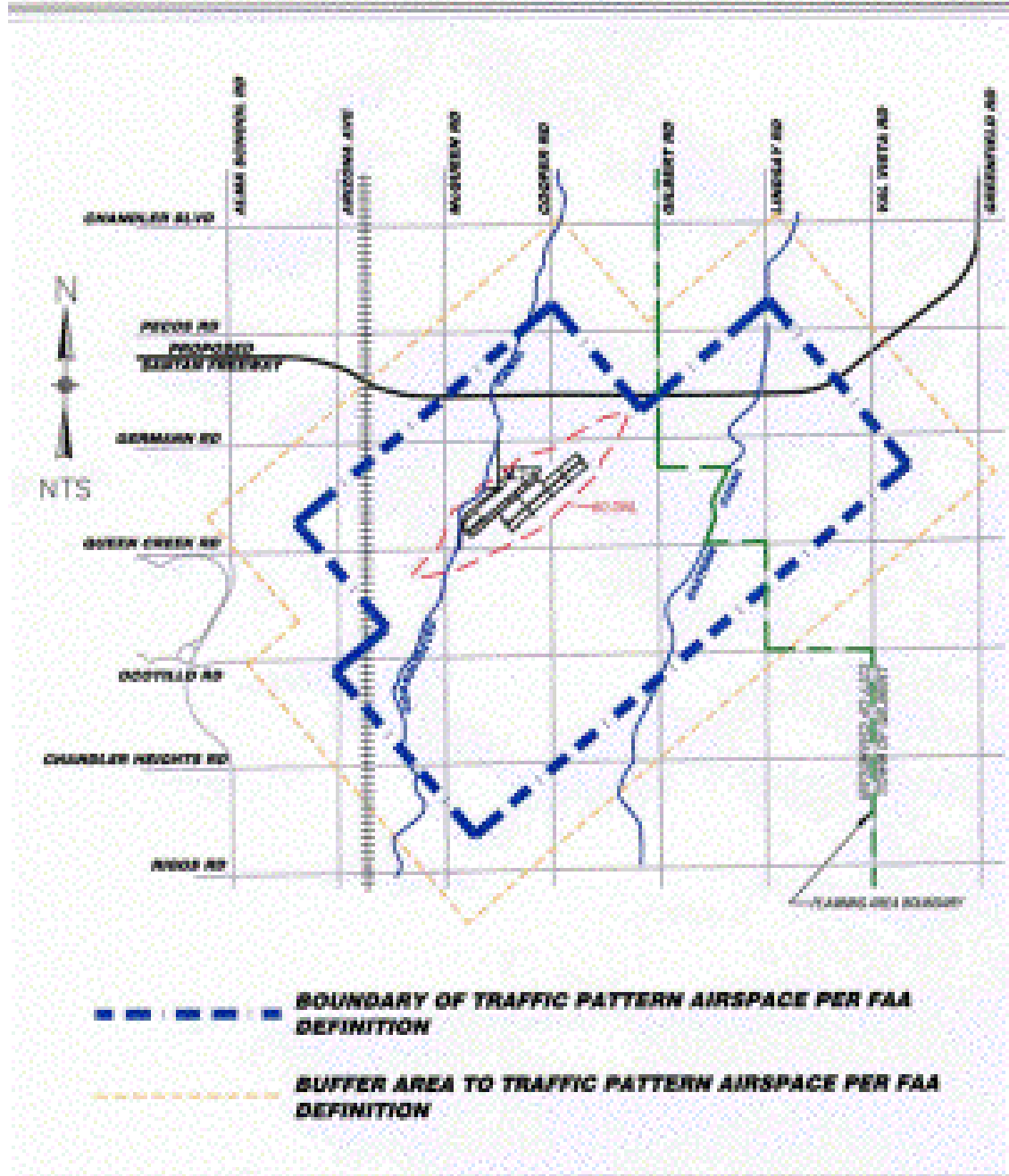
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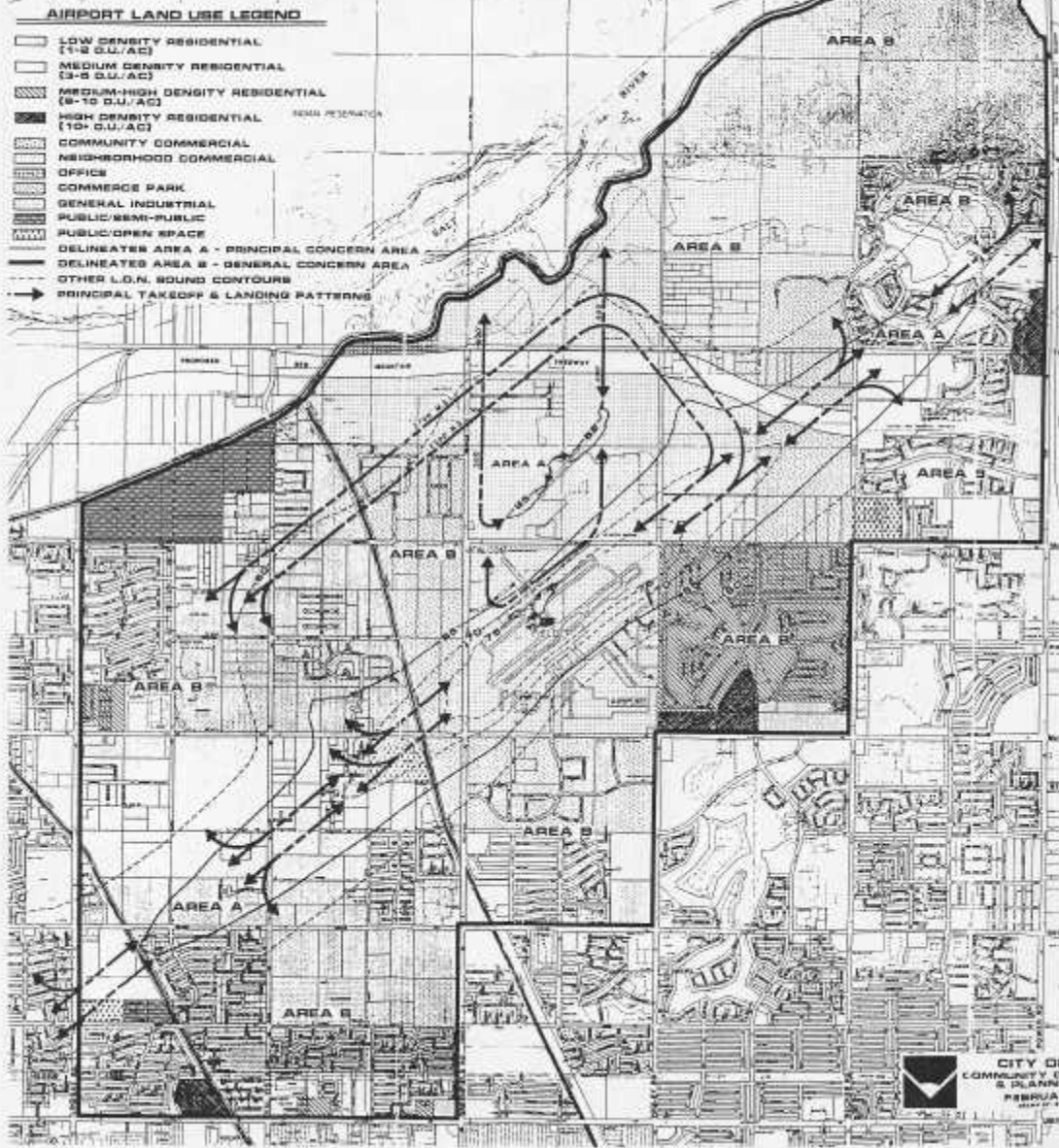
# CHANDLER MUNICIPAL AIRPORT

## TRAFFIC PATTERN AIRSPACE PER FAA DEFINITION

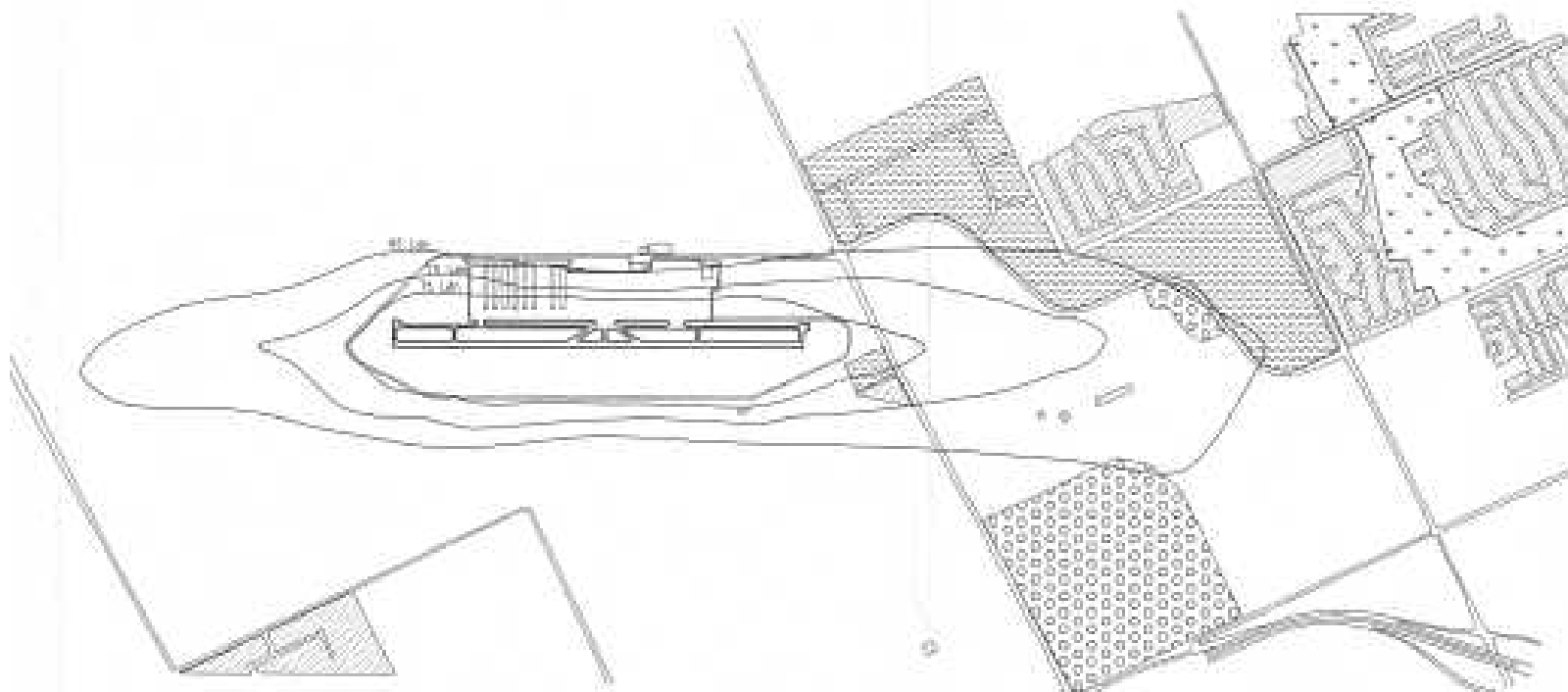




# FALCON FIELD AIRPORT LAND USE COMPATIBILITY



# Glendale Airport



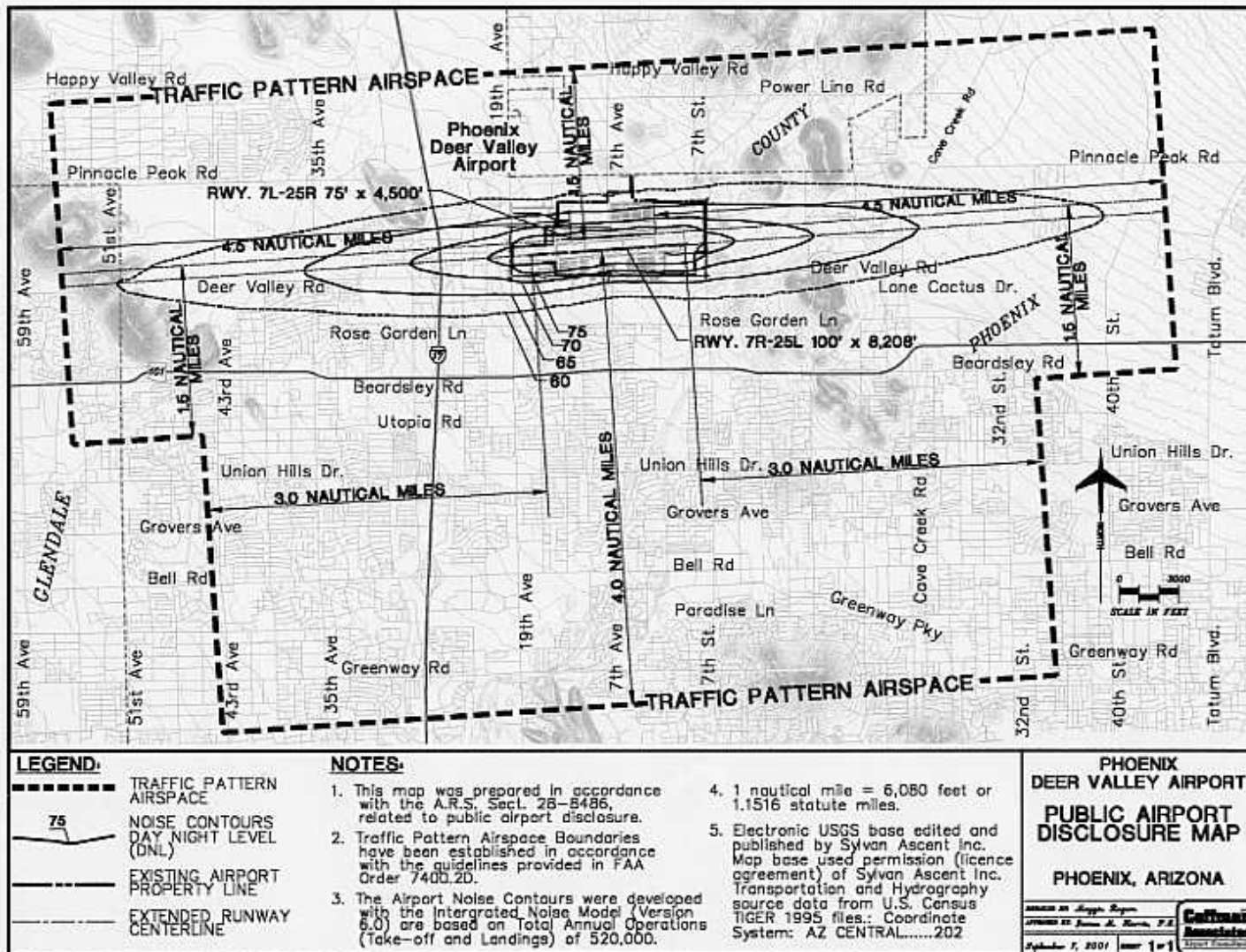
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300 1000

**Glendale Municipal**  
Glendale, Arizona

# Glendale Airport Traffic Patterns

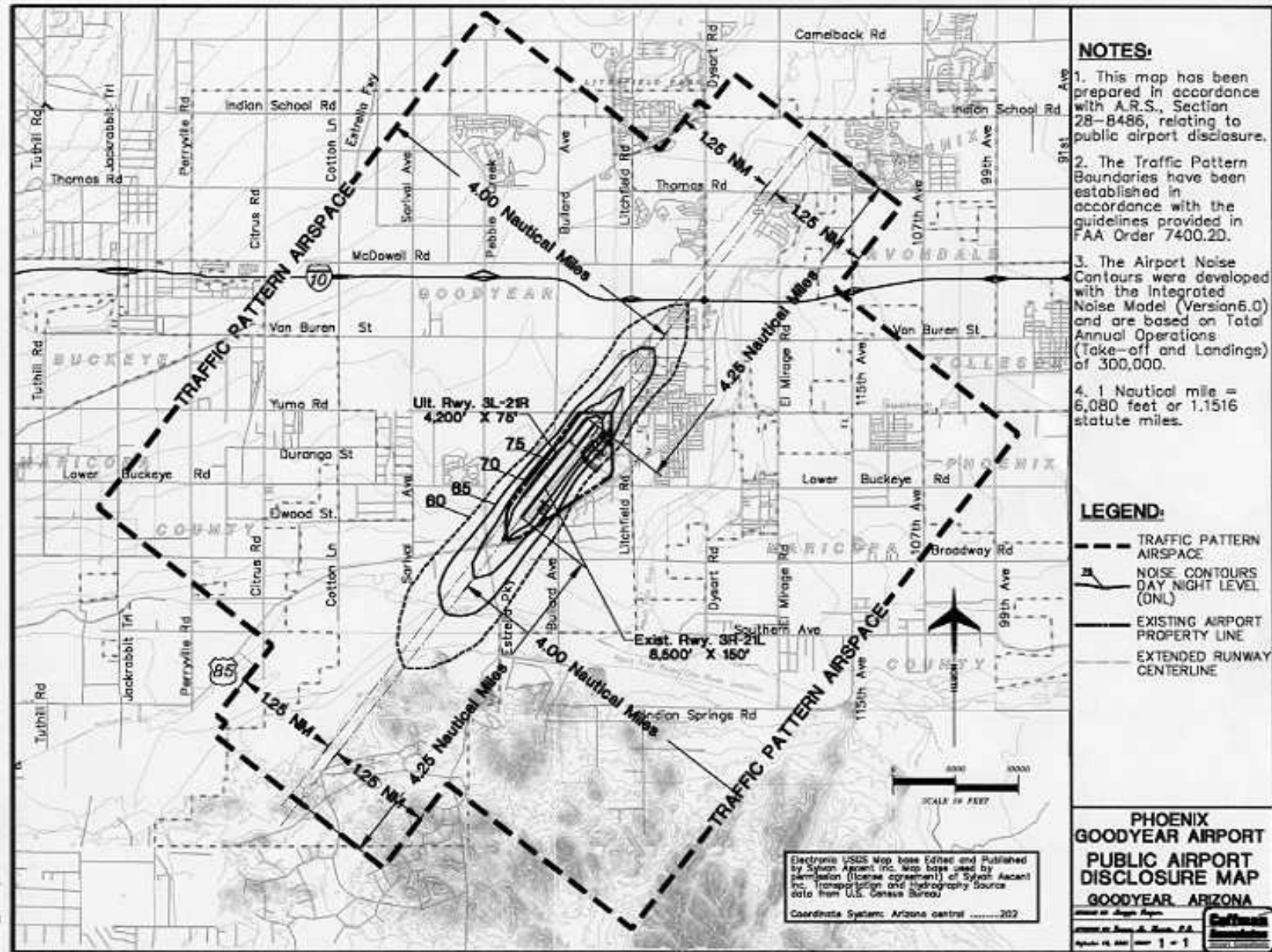


# Phoenix Deer Valley

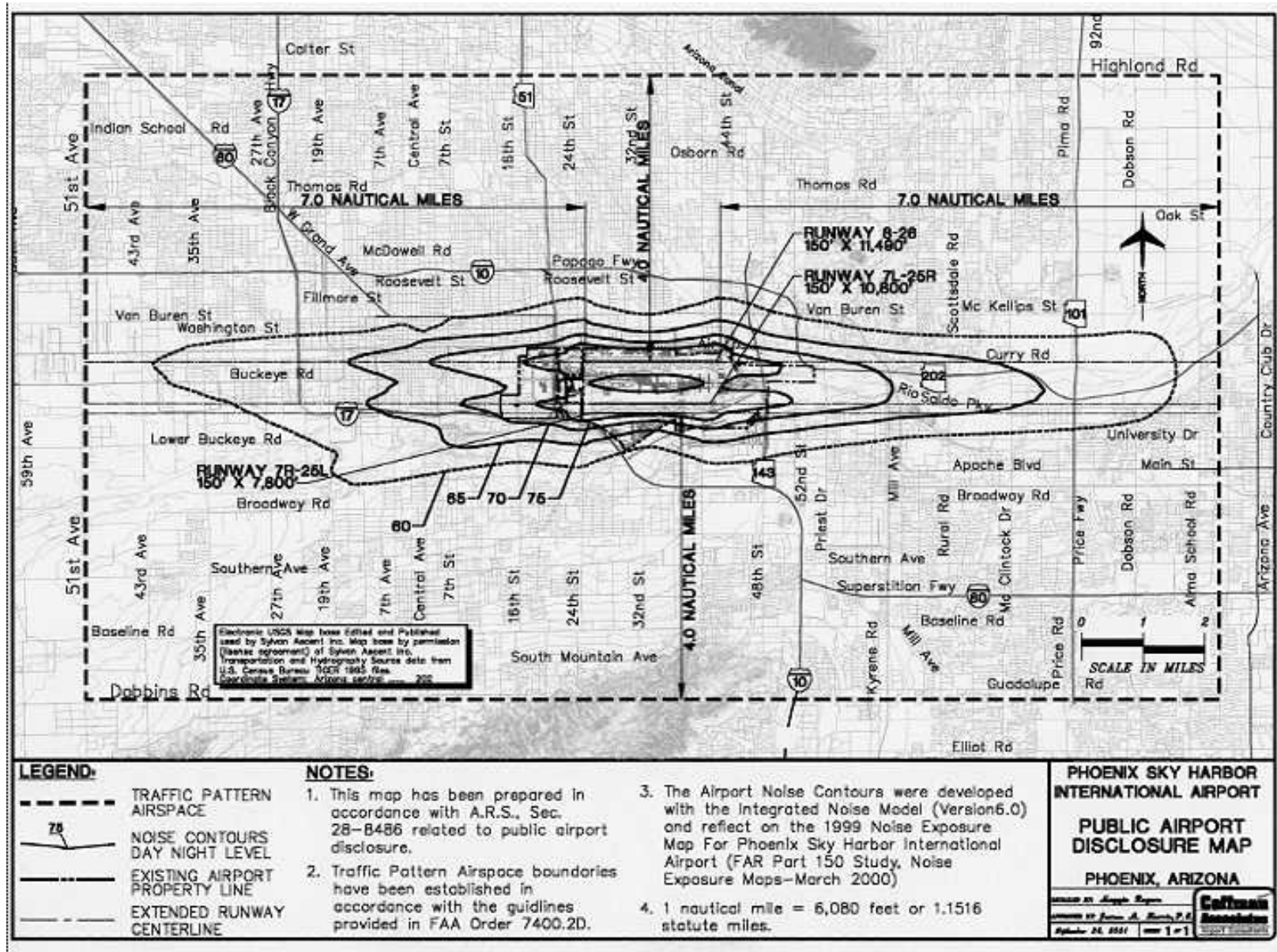




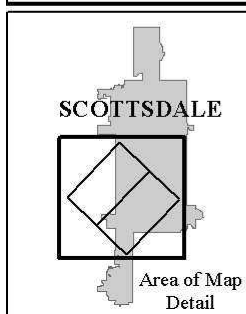
# Phoenix-Goodyear Airport



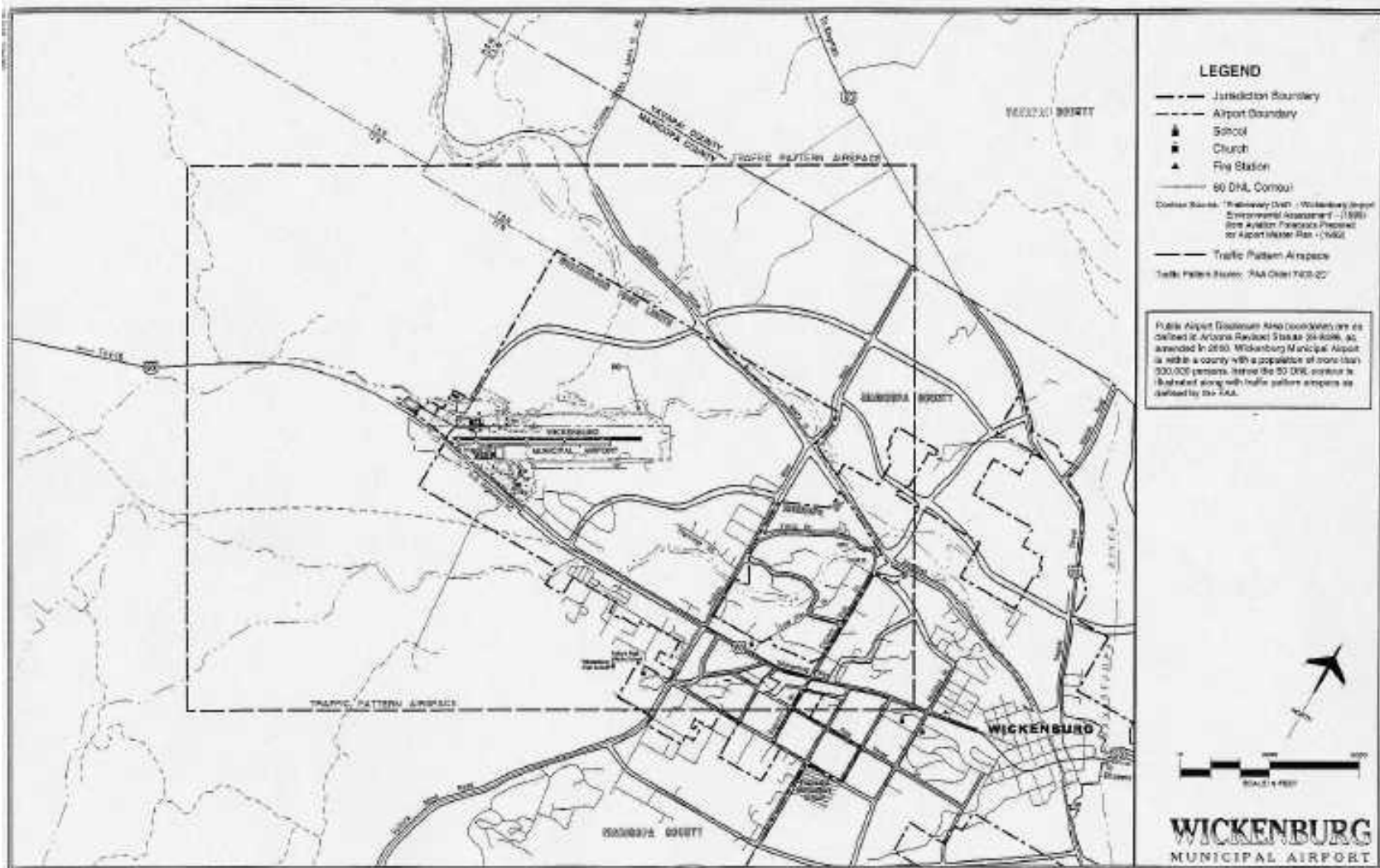
# Phoenix Sky Harbor International Airport



# Scottsdale Airport Traffic Pattern Airspace

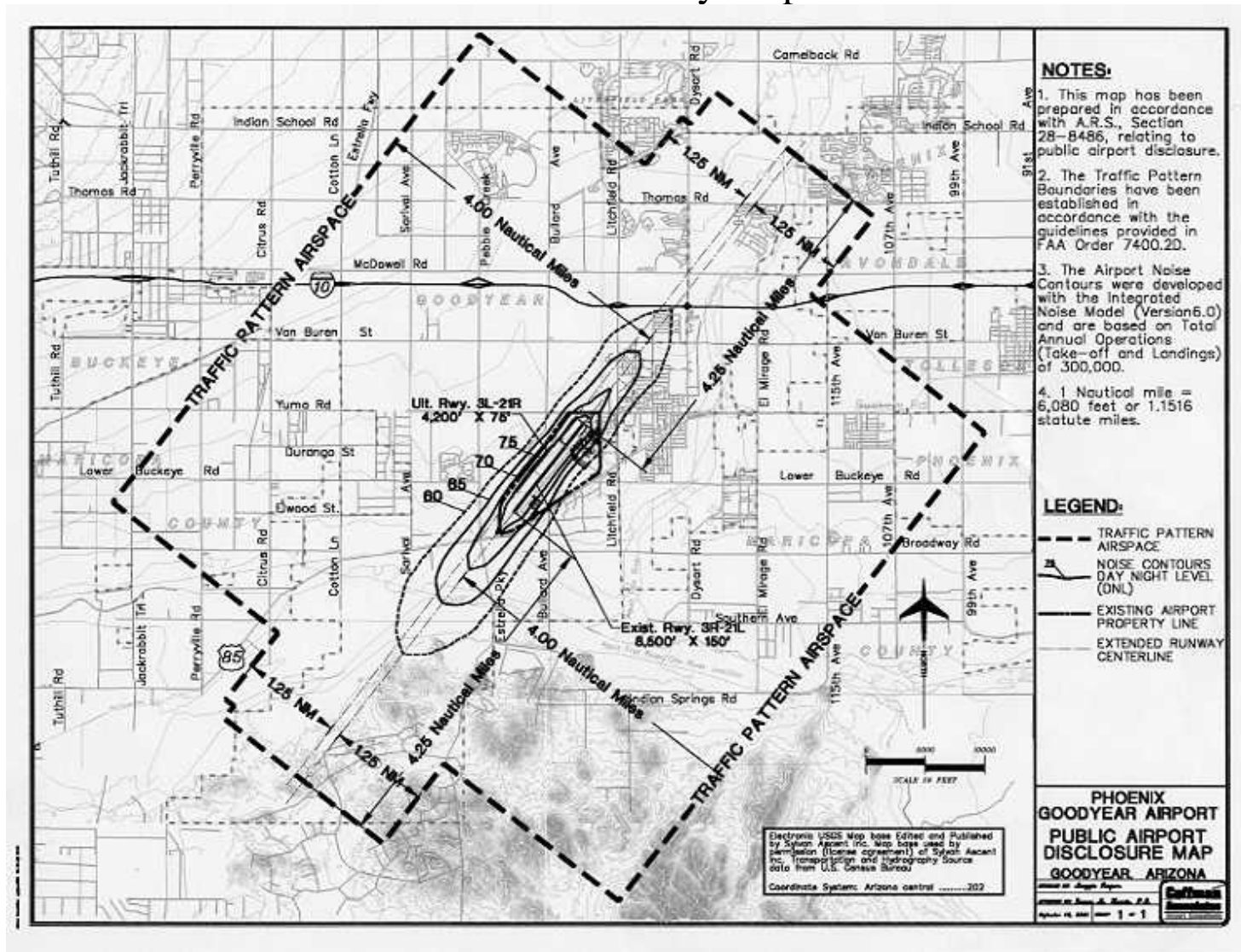


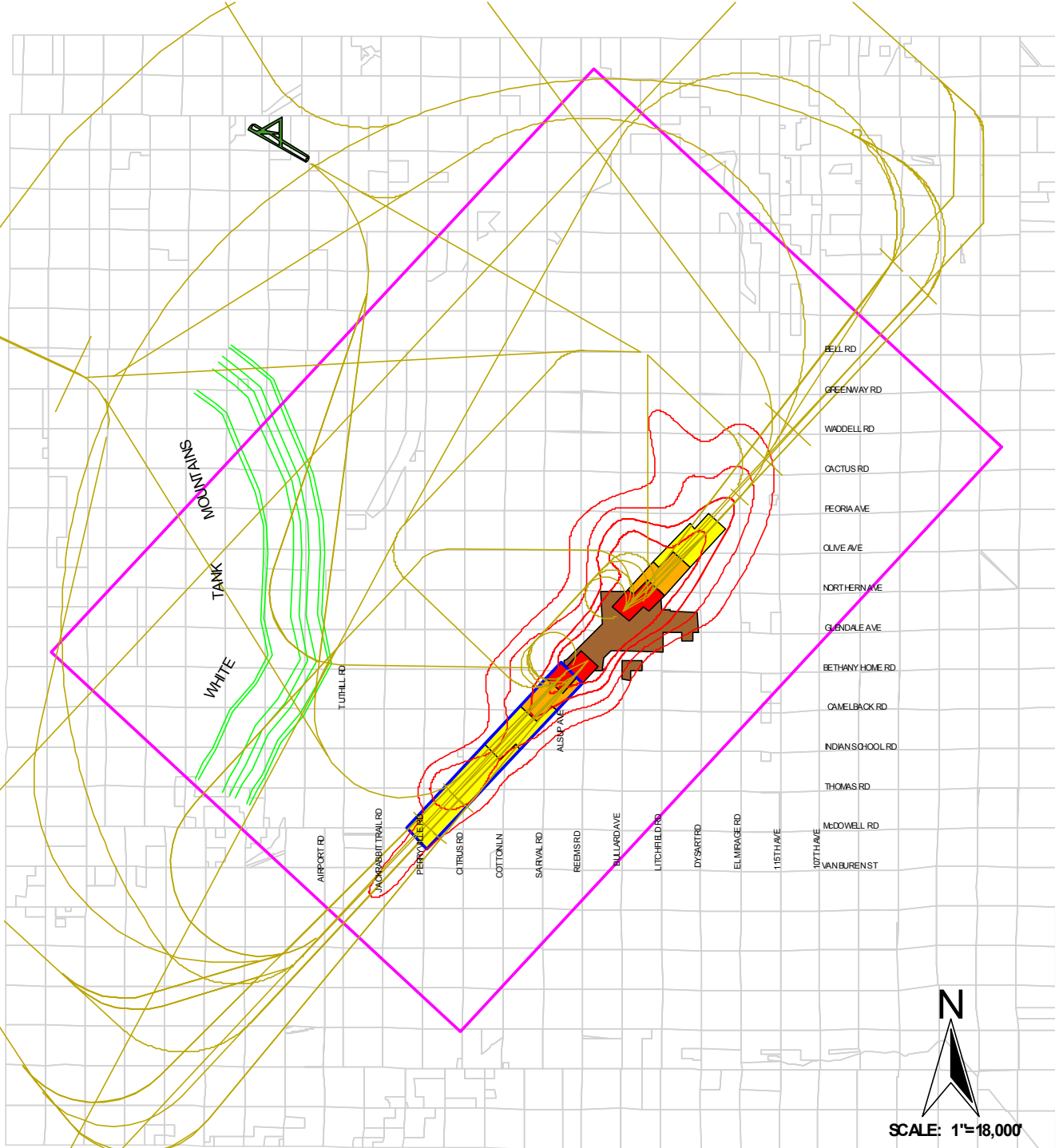
Map Date: October 18, 2001





# Williams Gateway Airport





## Legend

- LUKE AFB BOUNDARY
- MAJOR FLIGHT TRACKS
- TERRITORY IN THE VICINITY OF A MILITARY AIRPORT
- HIGH NOISE OR ACCIDENT POTENTIAL ZONE
- NOISE CONTOURS
- CLEAR ZONE
- ACCIDENT POTENTIAL ZONE 1
- ACCIDENT POTENTIAL ZONE 2

\* LINE WIDTHS ARE GRAPHIC REPRESENTATIONS ONLY

AS OF 2002.0620

# Appendix B

**Appendix B**  
**2025 Development Costs - Maximized Facilities**

Airport	Length	Width	Area	Unit	Unit Price	Scenario 1 Total	Scenario 2 Total
<b>Buckeye Municipal</b>							
Runway extension	1,800	100	20,000	SY	\$30	\$600,000	
Runway widening/strengthening	5,500	25	15,278	SY	\$40	\$611,100	
Parallel taxiway extension	3,400	35	13,222	SY	\$30	\$396,700	
MITL/HITL	3,400	NA	NA	LF	\$35	\$119,000	
Precision approach capability - MALS	FAA			LS			
MIRL/HIRL	7,300			LF	\$40	\$292,000	
Aircraft storage expansion	NA	NA	77	EA	\$30,000	\$2,772,000	
Subtotal						\$4,790,800	
Engineering & Contingency 20%						\$958,200	
<b>Total</b>						<b>\$5,749,000</b>	
<b>Chandler Municipal</b>							
Runway extension	1,950	100	21,667	SY	\$30	\$650,000	
Runway widening and strengthening	6,800	25	18,889	SY	\$40	\$755,600	
MIRL/HIRL	1,950			LF	\$40	\$78,000	
Parallel taxiway extensions	2,550	35	9,917	SY	\$30	\$297,500	
MITL/HITL	2,550			LF	\$35	\$89,300	
Precision approach capability - MALS	FAA			LS			
Aircraft storage expansion	NA	NA	415	EA	\$30,000	\$14,940,000	
Subtotal						\$16,810,400	
Engineering & Contingency 20%						\$3,362,100	
<b>Total</b>						<b>\$20,172,500</b>	
<b>Estrella Sailport</b>							
Visual aids - PAPI			2	EA	\$37,500	\$75,000	
Visual aids - REIL			2	EA	\$20,000	\$40,000	
Subtotal						\$115,000	
Engineering & Contingency 20%						\$23,000	
<b>Total</b>						<b>\$138,000</b>	
<b>Gila Bend Municipal</b>							
Increased pavement strength	5,200	75	43,333	SY	\$15	\$650,000	
Parallel taxiway extension	3,500	75	29,167	SY	\$30	\$105,000	
MITL	3,500			LF	\$30	\$105,000	
Improved approach capability - PAPI			2	EA	\$37,500	\$75,000	
Improved approach capability - REIL			2	EA	\$20,000	\$40,000	
Subtotal						\$975,000	
Engineering & Contingency 20%						\$195,000	
<b>Total</b>						<b>\$1,170,000</b>	
<b>Glendale Municipal</b>							
Parallel taxiway (east side)	7,500	35	29,167	SY	\$30	\$225,000	
Parallel taxiway extension (west side)	2,040	35	7,933	SY	\$30	\$61,200	
Precision approach capability - MALS	FAA			LS			
MIRL/HIRL	7,100			LF	\$40	\$284,000	
Aircraft storage expansion			156	EA	\$30,000	\$5,616,000	
Subtotal						\$5,900,000	
Engineering & Contingency 20%						\$1,180,000	
<b>Total</b>						<b>\$7,080,000</b>	
<b>Memorial</b>							
Runway reconstruction/paving/strengthening upgrade	6,700	100	74,444	SY	\$45	\$3,350,000	
MIRL/HIRL	6,700			LF	\$40	\$268,000	
Parallel taxiway construction	6,700	50	37,222	SY	\$30	\$1,116,667	
MITL/HITL	7,300			LF	\$35	\$255,500	
Improved approach capability - PAPI			2	EA	\$37,500	\$75,000	
Develop non-precision approach capability			1	LS	\$250,000	\$250,000	
Aircraft storage expansion			11	EA	\$30,000	\$330,000	
Subtotal						\$5,645,167	
Engineering & Contingency 20%						\$1,129,033	
<b>Total</b>						<b>\$6,774,200</b>	
<b>Mesa Falcon Field</b>							
Exit taxiway construction	600	40	2,667	SY	\$30	\$80,000	
MITL/HITL	600			LF	\$35	\$21,000	
Precision approach capability - MALS	FAA			LS			
Aircraft storage expansion			663	EA	\$30,000	\$19,890,000	
Subtotal						\$19,991,000	
Engineering & Contingency 20%						\$3,998,200	
<b>Total</b>						<b>\$23,989,200</b>	

Phoenix-Deer Valley							
Third parallel runway construction	5,000	100	55,556	SY	\$35	\$1,944,400	
MIRL/HIRL	5,000			LF	\$40	\$200,000	
Parallel taxiway construction	5,600	40	24,889	SY	\$35	\$871,100	
MITL/HITL	5,600			LF	\$35	\$196,000	
Precision approach capability - MALS	FAA			LS			
Aircraft storage expansion			878	EA	\$30,000	\$26,340,000	
Subtotal						\$29,551,500	
Engineering & Contingency 20%						\$5,910,300	
Total						\$35,461,800	
Phoenix-Goodyear							
Parallel runway construction	4,200	75	35,000	SY	\$35	\$1,225,000	
MIRL/HIRL	4,200			LF	\$40	\$168,000	
Parallel taxiway construction	5,000	40	22,222	SY	\$35	\$777,800	
MITL/HITL	5,000			LF	\$35	\$175,000	
Precision approach capability - MALS	FAA			LS			
Aircraft storage expansion			377	EA	\$30,000	\$11,310,000	
Subtotal						\$13,655,800	
Engineering & Contingency 20%						\$2,731,200	
Total						\$16,387,000	
Phoenix-Sky Harbor International							Scenario 2
						Scenario 1	
Fourth parallel runway construction and runway extension	11,000	150	183,333	SY	\$2,250	\$412,500,000	
MIRL/HIRL	11,000			LF	\$125	\$1,375,000	
Runway extension	1,700	150	28,333	SY	\$1,000	\$28,333,333	
MIRL/HIRL	1,700			LF	\$125	\$212,500	
Parallel & exit taxiway construction	13,400	75	111,667	SY	\$1,000	\$111,666,667	
MITL/HITL	13,400			LF	\$45	\$603,000	
Precision approach capability - MALS	FAA			LS			
Terminal building expansion							
Scenario 1			2,500,000	SF	\$275	\$687,500,000	
Scenario 2			3,900,000	SF	\$275	\$1,072,500,000	
Vehicular parking expansion							
Scenario 1			5,600	Spaces	\$6,500	\$36,400,000	
Scenario 2			12,100	Spaces	\$6,500	\$78,650,000	
Miscellaneous (environmental, access, studies, mitigation)				LS		\$125,000,000	
Subtotal						\$1,403,590,500	
Engineering & Contingency 20%						\$280,718,100	
Total						\$1,684,308,600	\$2,197,008,600
Pleasant Valley							
Runway construction/paving	3,800	60	25,333	SY	\$30	\$760,000	
MIRL/HIRL	3,800			LF	\$40	\$152,000	
Parallel taxiway construction	4,475	25	12,431	SY	\$30	\$134,300	
MITL/HITL	4,475			LF	\$35	\$156,600	
PAPI			2	EA	\$37,500	\$75,000	
REIL			2	EA	\$20,000	\$40,000	
Develop non-precision approach capability			1	LS	\$250,000	\$250,000	
Aircraft storage expansion			71	EA	\$30,000	\$2,130,000	
Subtotal						\$3,697,900	
Engineering & Contingency 20%						\$74,000	
Total						\$3,771,900	
Scottsdale							
Parallel and exit taxiway construction	3,635	40	16,156	SY	\$35	\$565,400	
MITL/HITL	3,635			LF	\$35	\$127,200	
Precision approach capability - MALS	FAA			LS			
Terminal building construction	20,500			SF	\$275	\$5,637,500	
Aircraft storage expansion			48	EA	\$30,000	\$1,440,000	
Subtotal						\$7,770,100	
Engineering & Contingency 20%						\$1,554,000	
Total						\$9,324,100	
Sky Ranch Carefree							
Runway widening	4,437	10	4,930	SY	\$30	\$147,900	
Install PAPI			2	EA	\$37,500	\$75,000	
Aircraft storage expansion			146	EA	\$30,000	\$4,380,000	
Subtotal						\$4,602,900	
Engineering & Contingency 20%						\$920,600	
Total						\$5,523,500	
Sellar							
Aircraft storage expansion			139	EA	\$30,000	\$4,170,000	
Subtotal						\$4,170,000	
Engineering & Contingency 20%						\$834,000	
Total						\$5,004,000	

Wickenburg Municipal						
Develop non-precision approach capability			1	LS	\$500,000	\$500,000
Aircraft storage expansion			29	EA	\$30,000	\$870,000
Subtotal						\$1,370,000
Engineering & Contingency 20%						\$274,000
Total						<b>\$1,644,000</b>
Williams Gateway						
Parallel runway development	12,000	150	200,000	SY	\$1,000	\$200,000,000
HIRL	12,000			LF	\$125	\$1,500,000
Parallel and exit taxiway construction	13,600	75	113,333	SY	\$1,000	\$13,600,000
MITL/HITL	13,600			LF	\$35	\$476,000
Runway 12L-30R extension	3,200	150	53,333	SY	\$1,000	\$53,333,300
HIRL	12,500			LF	\$125	\$1,562,500
Parallel and exit taxiway construction	4,800	75	40,000	SY	\$1,000	\$4,800,000
MITL/HITL	4,800			LF	\$35	\$168,000
Construct ALS	FAA			LS		
Terminal building construction	578,400			SF	\$275	\$159,060,000
Aircraft storage expansion			238	EA	\$30,000	\$7,140,000
Miscellaneous						\$75,000,000
Subtotal						\$301,063,800
Engineering & Contingency 20%						\$60,212,800
Total						<b>\$361,276,600</b>
<b>MAG Total</b>						<b>\$2,187,774,400</b>
						<b>\$2,700,474,400</b>

1/ Includes an estimate for land acquisition and relocation.

Sources: Arizona Department of Transportation Aeronautics Division Five-Year Airport Development Program FY2 2003-2007, Wilbur Smith Associates

**Appendix B**  
**2025 Development Costs - New Airport Facilities**

Airport	Length	Width	Area	Unit	Unit Price	Total
<b>New General Aviation Airport</b>						
Land Acquisition			750	Acre	\$25,000	\$18,750,000
Runway No. 1 - Paving	6,000	100	66,667	SY	\$30	\$2,000,000
Runway No. 1 - MIRL/HIRL	6,000			LF	\$40	\$240,000
Runway No. 1 - Parallel Taxiway	8,000	35	31,111	SY	\$30	\$933,333
Runway No. 1 - MITL/HITL	8,000	NA	NA	LF	\$35	\$280,000
PAPIs			2	EA	\$37,500	\$75,000
REILs			2	EA	\$20,000	\$40,000
Precision approach capability - MALS	FAA			LS		
Miscellaneous (Fuel, FBO, Parking, Admin., etc.)				LS	\$2,500,000	\$2,500,000
Access				LS	\$5,000,000	\$5,000,000
Utilities				LS	\$1,000,000	\$1,000,000
Aircraft storage	NA	NA	250	EA	\$71,500	\$21,450,000
Subtotal						\$52,268,333
Engineering & Contingency 20%						\$10,453,667
<b>Total</b>						<b>\$62,722,000</b>
<b>New Commercial Service Airport</b>						
Land Acquisition			3,500	Acre	\$25,000	\$87,500,000
Parallel Runway "A" construction	9,000	100	100,000	SY	\$250	\$25,000,000
HIRL	9,000			LF	\$125	\$1,125,000
Runway "A" Parallel & exit taxiway construction	11,000	50	61,111	SY	\$250	\$15,277,778
HITL	11,000			LF	\$75	\$825,000
VASI's			2	EA	\$37,500	\$75,000.00
REILs			2	EA	\$20,000	\$40,000.00
Precision approach capability - MALS	FAA			LS		
Terminal building construction			2,500,000	SF	\$275	\$687,500,000
Vehicular parking expansion			5,600	Spaces	\$6,500	\$36,400,000
Access				LS		\$65,000,000
Miscellaneous (Fuel, FBO, ARFF, Admin., etc.)				LS		\$75,000,000
Subtotal						\$993,742,778
Engineering & Contingency 20%						\$198,748,556
<b>Total</b>						<b>\$1,192,491,333</b>

# Appendix C



**Appendix C**  
**2025 Delay Costs - Status Quo**

2025																	
Airport Name	Total Airport		Airport Delay (Hours)					Commercial					General Aviation			Training Piston	Total
	Existing	Delay	Total	Local	Itinerant		Air Carrier	Commuter	Air Cargo	SEP	MEP	Transient Turbo-Prop	Turbo-Jet	Rotor			
ASV	(Minutes)						GA	Com.	\$1,760	\$1,609	\$2,640	\$150	\$233	\$587	\$1,205	\$465	\$111
Buckeye Municipal	315,560	172,160	2,869	2,009	861	861	N.A.	N.A.	N.A.	N.A.	\$88,036	\$0	\$0	\$62,864	\$51,550	\$222,947	\$425,398
Chandler Municipal	460,000	2,881,200	48,020	33,359	14,661	14,661	N.A.	N.A.	N.A.	N.A.	\$1,855,726	\$207,409	\$0	\$766,179	\$261,873	\$3,702,904	\$6,794,091
Estrella Sailport	120,000	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gila Bend Municipal	212,797	11,560	193	191	2	2	N.A.	N.A.	N.A.	N.A.	\$277	\$0	\$0	\$0	\$0	\$21,181	\$21,458
Glendale Municipal	257,972	236,400	3,940	2,523	1,417	1,417	N.A.	N.A.	N.A.	N.A.	\$187,470	\$19,958	\$0	\$28,150	\$10,863	\$280,029	\$526,469
Memorial	100,000	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mesa Falcon Field	443,000	2,643,760	44,063	21,586	22,476	22,476	N.A.	N.A.	N.A.	N.A.	\$2,965,435	\$168,403	\$0	\$683,077	\$658,986	\$2,396,079	\$6,871,980
Phoenix-Deer Valley	606,000	3,587,360	59,789	32,639	27,150	27,150	N.A.	N.A.	N.A.	N.A.	\$3,552,734	\$452,293	\$0	\$1,146,007	\$248,379	\$3,622,929	\$9,022,341
Phoenix-Goodyear	304,916	1,871,520	31,192	17,436	13,756	13,756	N.A.	N.A.	N.A.	N.A.	\$1,708,467	\$219,525	\$0	\$655,959	\$116,829	\$1,935,432	\$4,636,213
Phoenix-Sky Harbor International																	
Scenario 1	139	10,866,000	181,100	4,665	176,435	21,898	154,537	\$173,851,711	\$42,313,943	\$24,157,778	\$1,960,393	\$7,612,860	\$0	\$133,862,184	\$9,115,828	\$517,772	\$393,392,470
Scenario 2	139	26,763,000	446,050	11,489	434,561	53,935	380,626	\$428,197,435	\$104,219,406	\$59,500,701	\$4,828,456	\$18,750,504	\$0	\$329,703,076	\$22,452,321	\$1,275,274	\$968,927,173
Pleasant Valley	120,000	752,080	12,535	12,535	0	4,106	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$1,391,348	\$1,391,348
Scottsdale	200,000	3,939,000	65,650	28,210	37,440	35,444	1,996	N.A.	\$3,211,644	N.A.	\$3,336,373	\$1,383,229	\$0	\$8,870,477	\$736,139	\$3,131,288	\$20,669,150
Sky Ranch Carefree	174,000	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stellar Airpark	286,700	15,680	261	199	63	63	N.A.	N.A.	N.A.	N.A.	\$7,792	\$1,004	\$886	\$2,078	\$501	\$22,046	\$34,306
Wickenburg Municipal	245,000	3,810	64	6	57	57	N.A.	N.A.	N.A.	N.A.	\$6,858	\$666	\$0	\$3,443	\$1,772	\$705	\$13,444
Williams Gateway	410,000	1,176,840	19,614	8,920	10,694	3,438	7,256	\$1,642,286	N.A.	\$42,542	\$959,268	\$298,012	\$0	\$1,840,906	\$446,059	\$990,114	\$6,219,186
													Total Aircraft Delay Costs - Scenario 1				\$450,017,854
													Total Passenger Delay Costs - Scenario 1				\$193,176,236
													Total Airport Delay Costs - Scenario 1				\$643,194,090
													Total Aircraft Delay Costs - Scenario 2				\$1,025,552,558
													Total Aircraft Delay Costs - Scenario 2				\$489,546,236
													Total Aircraft Delay Costs - Scenario 2				\$1,515,098,793

Source: Airport master plans, Airport operator estimates, FAA Advisory Circular 150/5060-5, FAA air traffic control tower records, Maricopa Association of Governments

## Appendix C

### 2025 Delay Costs - Improved Technology

	2025																
	Total		Airport Delay					Commercial Costs					General Aviation Transient			Training Piston	
	Existing	Airport Delay	Total	Local	Total Itinerant	GA Itinerant	Com. Itinerant	Air Carrier	Commuter	Air Cargo	SEP	MEP	Turbo-Prop	Turbo-Jet	Rotor		
	Airport Name	ASV	(Minutes)	(Hours)	(Hours)	(Hours)	(Hours)	(Hours)	\$1,760	\$1,609	\$2,640	\$150	\$233	\$587	\$1,205	\$465	\$111
Buckeye Municipal	325,000	172,160	2,869	2,009	861	861	N.A.	N.A.	N.A.	N.A.	\$88,036	\$0	\$0	\$62,864	\$51,550	\$222,947	\$425,398
Chandler Municipal	473,800	2,881,200	48,020	33,359	14,661	14,661	N.A.	N.A.	N.A.	N.A.	\$1,855,726	\$207,409	\$0	\$766,179	\$261,873	\$3,702,904	\$6,794,091
Estrella Sailport	120,600	0		0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gila Bend Municipal	218,100	11,560	193	191	2	2	N.A.	N.A.	N.A.	N.A.	\$277	\$0	\$0	\$0	\$0	\$21,181	\$21,458
Glendale Municipal	265,700	157,600	2,627	1,682	945	945	N.A.	N.A.	N.A.	N.A.	\$124,980	\$13,305	\$0	\$18,766	\$7,242	\$186,686	\$350,979
Memorial	100,500	0		0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mesa Falcon Field	456,290	1,321,880	22,031	10,793	11,238	11,238	N.A.	N.A.	N.A.	N.A.	\$1,482,717	\$84,201	\$0	\$341,539	\$329,493	\$1,198,040	\$3,435,990
Phoenix-Deer Valley	621,150	1,793,680	29,895	16,319	13,575	13,575	N.A.	N.A.	N.A.	N.A.	\$1,776,367	\$226,146	\$0	\$573,004	\$124,189	\$1,811,464	\$4,511,171
Phoenix-Goodyear	311,000	1,871,520	31,192	17,436	13,756	13,756	N.A.	N.A.	N.A.	N.A.	\$1,708,467	\$219,525	\$0	\$655,959	\$116,829	\$1,935,432	\$4,636,213
Phoenix-Sky Harbor International																	
Scenario 1	148	7,244,000	120,733	3,110	117,624	14,599	103,025	\$115,901,140	\$28,209,296	\$16,105,186	\$1,306,929	\$5,075,240	\$0	\$89,241,456	\$6,077,219	\$345,181	\$262,261,646
Scenario 2	158	17,842,000	297,367	7,659	289,707	35,957	253,751	\$285,464,957	\$69,479,604	\$39,667,134	\$3,218,971	\$12,500,336	\$0	\$219,802,051	\$14,968,214	\$850,183	\$645,951,449
Pleasant Valley	120,600	752,080	12,535	12,535	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$1,391,348	\$1,391,348
Scottsdale	216,000	2,626,000	43,767	18,807	24,960	23,629	1,331	N.A.	\$2,141,096	N.A.	\$2,224,248	\$922,153	\$0	\$5,913,651	\$490,759	\$2,087,526	\$13,779,434
Sky Ranch Carefree	176,610	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stellar Airpark	291,000	15,680	261	199	63	63	N.A.	N.A.	N.A.	N.A.	\$7,792	\$1,004	\$886	\$2,078	\$501	\$22,046	\$34,306
Wickenburg Municipal	251,100	3,810	64	6	57	57	N.A.	N.A.	N.A.	N.A.	\$6,858	\$666	\$0	\$3,443	\$1,772	\$705	\$13,444
Williams Gateway	442,800	756,540	12,609	5,734	6,875	2,210	4,665	\$1,055,755	N.A.	\$27,348	\$616,672	\$191,579	\$0	\$1,183,439	\$286,752	\$636,502	\$3,998,048
Total Aircraft Delay Costs - Scenario 1																	\$301,653,526
Total Passenger Delay Costs - Scenario 1																	\$128,685,278
Total Delay Costs - Scenario 1																	\$430,338,804
Total Aircraft Delay Costs - Scenario 2																	\$685,343,329
Total Passenger Delay Costs - Scenario 2																	\$326,265,278
Total Delay Costs - Scenario 2																	\$1,011,608,607

Source: Airport master plans, Airport operator estimates, FAA Advisory Circular 150/5060-5, FAA air traffic control tower records, Maricopa Association of Governments

**Appendix C**  
**2025 Delay Costs - Maximized Airport Development**

Airport Name	2025																				
	Annual			Average Aircraft	Total	Airport Delay					Commercial Costs				General Aviation Transient			Training			
	Existing	Annual	Demand	Delay	Airport Delay	Total	Local	Total Itinerant	GA Itinerant	Com. Itinerant	Air Carrier	Commuter	Air Cargo	SEP	MEP	Turbo Prop	Turbo-Jet	Rotor	Piston		
	ASV	Operations	/ASV	(Minutes)	(Minutes)	(Hours)	(Hours)	(Hours)	(Hours)	(Hours)	\$1,760	\$1,609	\$2,640	\$150	\$233	\$587	\$1,205	\$465	\$111	Total	
Buckeye Municipal	325,000	215,200	0.7	0.8	172,160	2,869	2,009	861	861	N.A.	N.A.	N.A.	N.A.	\$88,036	\$0	\$0	\$62,864	\$51,550	\$222,947	\$425,398	
Chandler Municipal	473,800	215,200	0.7	0.8	2,881,200	48,020	33,359	14,661	14,661	N.A.	N.A.	N.A.	N.A.	\$1,855,726	\$207,409	\$0	\$766,179	\$261,873	\$3,702,904	\$6,794,091	
Estrella Sailport	120,600	215,200	0.7	0.8	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Gila Bend Municipal	218,100	215,200	0.7	0.8	11,560	193	191	2	2	N.A.	N.A.	N.A.	N.A.	\$277	\$0	\$0	\$0	\$0	\$21,181	\$21,458	
Glendale Municipal	265,700	215,200	0.7	0.8	157,600	2,627	1,682	945	945	N.A.	N.A.	N.A.	N.A.	\$124,980	\$13,305	\$0	\$18,766	\$7,242	\$186,686	\$350,979	
Memorial	240,000	215,200	0.7	0.8	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Mesa Falcon Field	510,000	215,200	0.7	0.8	849,780	14,163	6,938	7,225	7,225	N.A.	N.A.	N.A.	N.A.	\$953,175	\$54,129	\$0	\$219,561	\$211,817	\$770,168	\$2,208,851	
Phoenix-Deer Valley	650,000	215,200	0.7	0.8	1,793,680	29,895	16,319	13,575	13,575	N.A.	N.A.	N.A.	N.A.	\$1,776,367	\$226,146	\$0	\$573,004	\$124,189	\$1,811,464	\$4,511,171	
Phoenix-Goodyear	470,000	215,200	0.7	0.8	267,360	4,456	2,491	1,965	1,965	N.A.	N.A.	N.A.	N.A.	\$244,067	\$31,361	\$0	\$93,708	\$16,690	\$276,490	\$662,316	
Phoenix-Sky Harbor International																					
Scenario 1	155	724,400	1.1	5.6	4,056,640	67,611	1,741	65,869	8,175	57,694	\$64,904,639	\$15,797,206	\$9,018,904	\$731,880	\$2,842,135	\$0	\$49,975,215	\$3,403,243	\$193,301	\$146,866,522	
Scenario 2	176	724,400	1.1	5.6	8,921,000	148,683	3,830	144,854	17,978	126,875	\$142,732,478	\$34,739,802	\$19,833,567	\$1,609,485	\$6,250,168	\$0	\$109,901,025	\$7,484,107	\$425,091	\$322,975,724	
Pleasant Valley	230,000	724,400	1.1	5.6	80,580	1,343	1,343	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$149,073	\$149,073	
Scottsdale	225,000	724,400	1.1	5.6	2,626,000	43,767	18,807	24,960	23,629	1,331	N.A.	\$2,141,096	N.A.	\$2,224,248	\$922,153	\$0	\$5,913,651	\$490,759	\$2,087,526	\$13,779,434	
Sky Ranch Carefree	176,610	724,400	1.1	5.6	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Stellar Airpark	286,700	724,400	1.1	5.6	15,680	261	199	63	63	N.A.	N.A.	N.A.	N.A.	\$7,792	\$1,004	\$886	\$2,078	\$501	\$22,046	\$34,306	
Wickenburg Municipal	355,000	724,400	1.1	5.6	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0	
Williams Gateway	512,500	724,400	1.1	5.6	504,360	8,406	3,823	4,583	1,473	3,110	\$703,837	N.A.	\$18,232	\$411,115	\$127,720	\$0	\$788,960	\$191,168	\$424,334	\$2,665,366	
																Total Aircraft Delay Costs - Scenario 1				\$178,468,964	
																Total Passenger Delay Cost - Scenario 1				\$72,579,767	
																Total Delay Cost - Scenario 1				\$251,048,731	
																Total Aircraft Delay Costs - Scenario 2				\$354,578,167	
																Total Passenger Delay Costs - Scenario 2				\$163,840,367	
																Total Delay Costs - Scenario 2				\$518,418,534	

**Appendix C**  
**2025 Delay Costs - New Airport Development**

Airport Name	2025																
	Existing	Total Airport Delay	Total (Hours)	Local (Hours)	Airport Delay			Commercial Costs				General Aviation			Training Piston	Total	
		Total Itinerant (Hours)			GA Itinerant (Hours)	Com. Itinerant (Hours)	Air Carrier	Commuter	Air Cargo	SEP	MEP	Transient Turbo- Prop	Turbo-Jet	Rotor			
ASV	(Minutes)	(Hours)	(Hours)	(Hours)	(Hours)	(Hours)	(Hours)	\$1,760	\$1,609	\$2,640	\$150	\$233	\$587	\$1,205	\$465	\$111	Total
Buckeye Municipal	325,000	172,160	2,869	2,009	861	861	N.A.	N.A.	N.A.	N.A.	\$88,036	\$0	\$0	\$62,864	\$51,550	\$222,947	\$425,398
Chandler Municipal	473,800	1,440,600	24,010	16,680	7,330	7,330	N.A.	N.A.	N.A.	N.A.	\$927,863	\$103,704	\$0	\$383,090	\$130,936	\$1,851,452	\$3,397,045
Estrella Sailport	120,600	0		0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Gila Bend Municipal	218,100	11,560	193	191	2	2	N.A.	N.A.	N.A.	N.A.	\$277	\$0	\$0	\$0	\$0	\$21,181	\$21,458
Glendale Municipal	265,700	94,560	1,576	1,009	567	567	N.A.	N.A.	N.A.	N.A.	\$74,988	\$7,983	\$0	\$11,260	\$4,345	\$112,012	\$210,588
Memorial	100,500	0		0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Mesa Falcon Field	456,290	1,321,880	22,031	10,793	11,238	11,238	N.A.	N.A.	N.A.	N.A.	\$1,482,717	\$84,201	\$0	\$341,539	\$329,493	\$1,198,040	\$3,435,990
Phoenix-Deer Valley	621,150	576,540	9,609	5,246	4,363	4,363	N.A.	N.A.	N.A.	N.A.	\$570,975	\$72,690	\$0	\$184,180	\$39,918	\$582,256	\$1,450,019
Phoenix-Goodyear	311,000	935,760	15,596	8,718	6,878	6,878	N.A.	N.A.	N.A.	N.A.	\$854,234	\$109,763	\$0	\$327,980	\$58,414	\$967,716	\$2,318,107
Phoenix-Sky Harbor International																	
Scenario 1	148	3,852,240	64,204	1,654	62,550	7,763	54,787	\$61,634,319	\$15,001,239	\$8,564,473	\$695,003	\$2,698,929	\$0	\$47,457,138	\$3,231,765	\$183,562	\$139,466,428
Scenario 2	158	12,834,000	213,900	5,509	208,391	25,864	182,526	\$205,338,934	\$49,977,650	\$28,533,124	\$2,315,451	\$8,991,667	\$0	\$158,106,687	\$10,766,845	\$611,548	\$464,641,906
Pleasant Valley	120,600	376,040	6,267	6,267	0	2,053	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$695,674	\$695,674
Scottsdale	216,000	378,144	6,302	2,708	3,594	3,355	240	N.A.	\$385,397	N.A.	\$320,292	\$132,790	\$0	\$851,566	\$70,669	\$300,604	\$2,061,318
Sky Ranch Carefree	176,610	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stellar Airpark	291,000	15,680	261	199	63	63	N.A.	N.A.	N.A.	N.A.	\$7,792	\$1,004	\$886	\$2,078	\$501	\$22,046	\$34,306
Wickenburg Municipal	0	0	0	0	0	0	N.A.	N.A.	N.A.	N.A.	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Williams Gateway	442,800	756,540	12,609	8,814	3,795	1,220	2,575	\$582,845	N.A.	\$31,865	\$340,443	\$105,764	\$0	\$653,335	\$158,306	\$978,320	\$2,850,879
New GA Airport	325,000	302,400	5,040	2,817	2,223	2,223	N.A.	NA	NA	NA	\$276,054	\$35,471	\$0	\$105,990	\$18,877	\$312,727	\$749,119
New Commercial Airport	325,000	123,900	2,065	53	2,012	250	1,762	\$1,982,351	\$482,486	\$275,460	\$22,353	\$86,806	\$0	\$1,526,369	\$103,944	\$5,904	\$4,485,673
Total Aircraft Delay Costs - Scenario 1																	\$161,602,002
Total Passneger Delay Costs - Scenario 1																	\$69,550,403
Total Airport Delay Costs - Scenario 1																	\$231,152,405
Total Aircraft Delay Costs - Scenario 2																	\$615,471,367
Total Passenger Delay Costs - Scenario 2																	\$235,205,653
Total Airport Delay Costs - Scenario 2																	\$850,677,019

Source: Airport master plans, Airport operator estimates, FAA Advisory Circular 150/5060-5, FAA air traffic control tower records, Maricopa Association of Governments